

American Aviation

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NOV. 23

J-17 #13



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Chief Engineer
Helicopter Division
Bell Aircraft

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AEROPRODUCTS SELF-LOCKING ACTUATORS PERMIT INSTANT FLIGHT SURFACE CONTROL

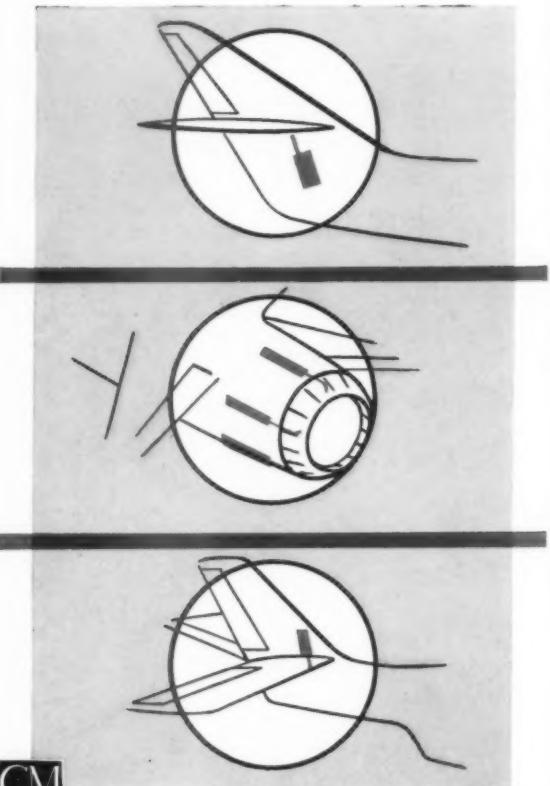
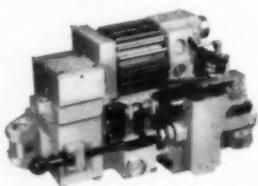
AEROPRODUCTS SELF-LOCKING ACTUATORS MAKE POSSIBLE THE INSTANT, ABSOLUTE CONTROL OF MOBILE AIRCRAFT SURFACES. AN AEROPRODUCTS ACTUATOR WILL ADJUST A MOBILE SURFACE TO ANY POSITION WITHIN THE DESIGN RANGE, LOCK THE SURFACE IN THE SELECTED POSITION, AND HOLD IT UNTIL CHANGE IS REQUIRED.

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Several major shifts in operating equipment of the larger airlines are in the wind. Eastern Air Lines' reported order for 12 Douglas DC-7's is first.

One domestic operator has reopened the possibility of buying Comets for a highly competitive route. Company's representative was at de Havilland very recently to make "final" decision. Actual purchase is highly improbable.

Another major airline is reported attempting to unload its entire fleet of postwar twin-engine aircraft. Market for these aircraft is major stumbling block.

Boeing and Pan American have been actively discussing major modification to the Stratocruiser, including addition of some 13 feet of fuselage length and souped up P&W R-4360 engines, which would pave way for future turboprop installations. Cost per unit would be about \$1 million.

Market for used transport aircraft, which has already taken a sharp drop, is still in very delicate position. USAF holds key to market in action on higher rentals, possible sale of C-46's, and decisions on civil air movements of military personnel.

•

Amazing aspect of civil/military controversy over distance measuring equipment, which has created the first major break in the so-called "common system," is that enthusiasm for civil system remains high. Reported backlog for civil DME at Bendix Radio and Narco approaches half million dollars. Production is underway and first deliveries are scheduled for this January.

Defense Department officials are making major effort to resolve issues involved in the non-compatible systems, but it is an engineering problem not lending itself to compromise. Meanwhile financial implications of decision either way grow day by day.

•

Outlook for early settlement of the strike of CIO-Autoworkers at North American Aviation is good. Although refusal of IAM-AFL workers to strike Douglas Santa Monica and El Segundo plants and accept offer comparable to NAA proposal is a factor, softening of the labor market is also important. Jobs are less plentiful.

6000 of the 33,000 workers who left their jobs have since returned.

•

Competitive snowballing of coach service is likely in near future, led by Eastern Air Lines' filing of two level coach fares over its entire system. Improving equipment situation is factor with all lines. EAL move pressures Delta. Capital may also have to meet these moves.

Braniff is in domestic coach market for first time, operating through AA's and TWA's midwestern market.

•

Military encroachment upon civil aviation facilities at airports is likely to get Congressional attention at the next session. Increased military pressure on local airports has already resulted from speculation. CAA is under pressure for the long delay in using existing laws to help operators—i.e., by formulating "substantial use" definition.



The Washington View

Market for the 707

Pentagon sources indicate there is every possibility now that the Air Force will soon place an order with Boeing Aircraft Co. for the 707 jet transport, which would be used as an aerial tanker (see page 13). SAC Commander Gen. Curtis Lemay reportedly has told the Pentagon he wants the aircraft to refuel high-speed B-47's and forthcoming B-52's and F-101's.

Boeing officials, however, are only cautiously optimistic over selling the Air Force its 707, which ostensibly is under development for the commercial market. Air Force interest springs from the growing need to replace the relatively slow, piston-engine K-97 as a tanker. A jet-propelled tanker would be more advantageous. The Boeing 707 could be the answer, being the nearest thing to production of the type plane required.

Education of a Senator

The whirlwind tour of U. S. aircraft and engine manufacturing plants undertaken by Sen. Ralph Flanders (R., Vt.) ended this week in Hartford with a visit at Pratt & Whitney. In less than two weeks the doughty Vermonter stopped at two other engine plants and seven west coast airframe builders. He asked to see only three people particularly; the head of the firm and the top men in operations and in engineering.

After one day in Seattle with the Boeing people, the Senator hopped to Los Angeles for two full days with representatives from five area companies. The purpose of the trip, it turns out however, was Flander's own personal edification.

Although he was accompanied by a staff member of the Senate Preparedness Investigating subcommittee, Wallace Engle, it is not expected that there will be a public report issued.

Two More Studies

Another series of studies by the Transportation Advisory Council of the Commerce Department has been set up. This time the advisory group, which is composed of transport officials and shippers to advise the Under Sec-

retary for Transportation on policy matters, has planned two studies, one is brand new; the other is an old saw.

The first is to be a review of the effect of first class mail by air experiments on other forms of transportation. Then, there is to be another study of the old question as to the desirability of a single government regulatory agency for transportation.

A working panel on first class mail by air is yet to be selected but it is expected that ATA's Dr. Myles Robinson will represent the industry.

The single regulatory agency question is to be considered by a panel headed by Grover Plowman, vice president of U. S. Steel, and will include Stuart G. Tipton, ATA counsel, who will represent the airlines.

Setting the User Charges

Although it is virtually certain that user charges for the Federal airways will soon be with us, the question still remains as to how they will be applied. Not only the method but the basis for applying the charges is still to be determined.

Unexpectedly, because he has studiously avoided comment, Commerce Under Secretary Robert Murray reportedly is as dissatisfied as a number of others at the severe user charges recommended in the new CAA staff report. Murray unquestionably favors user charges, but reportedly winced at the high ones proposed.

It may well be that the original CAA report will be substantially revised as a Department report after further review by Murray's deputy, Charles Dearing, and his staff user-charge expert, Mel Brenner. This review is already underway. It began with an evaluation of comments received from both industry and government. Target date for submitting a final report to the Budget Bureau for consideration is still early December.

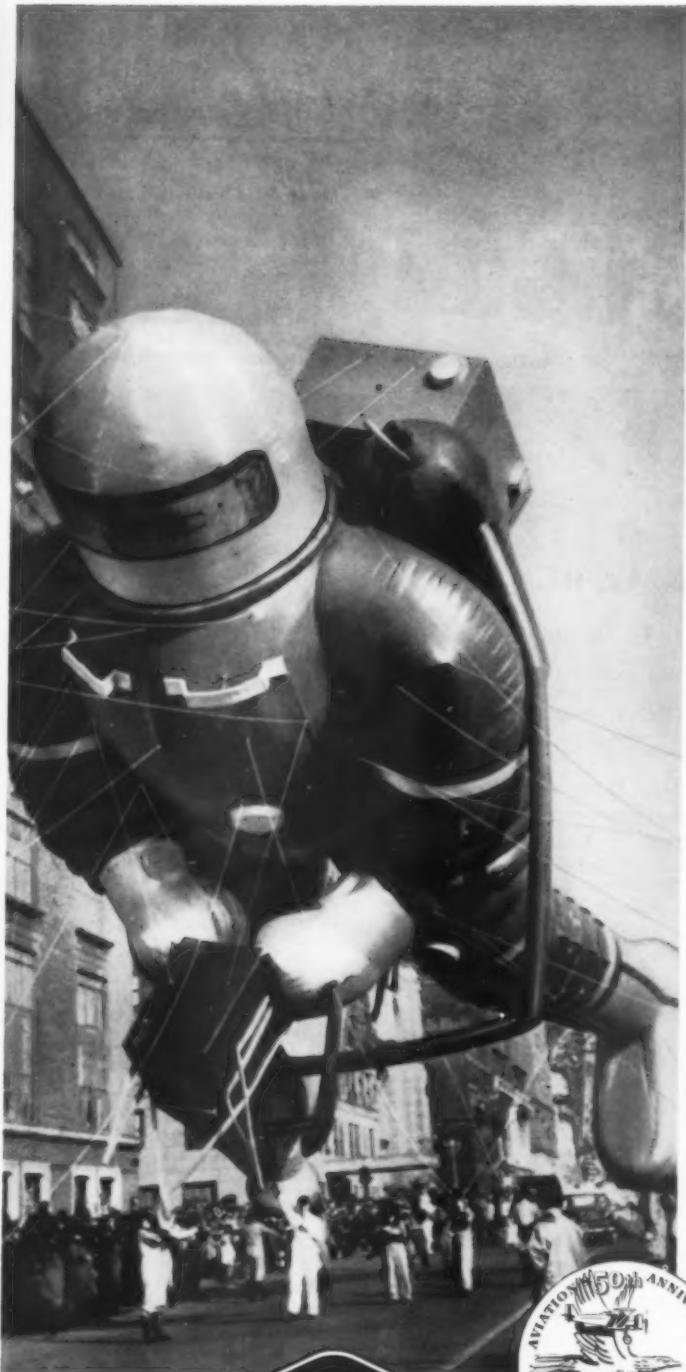
Trouble Up North

One good reason behind the U. S.'s refusal to enter informal negotiations with Canada over air routes is that there is nothing for the U. S. to bargain for at this time. The result is that diplomatic relations are extremely chilly now between the two countries.

Canada wanted informal negotiations because it has trans-border ambitions for Trans-Canada Air Lines. Presumably, the TCA proposal to use Tampa, Fla., as a stop-over for Montreal-Mexico City flights was one phase of its plans.

Inside reports here are that U. S. officials feel such negotiations would be one-sided and deferred in favor of (1) no negotiations, or (2) reopening bilateral talks on a formal basis.

. . . PREBLE STAVER



WHITHER NOW, SPACE MAN?

THIS giant "Space Man" will be a feature of this year's Macy Thanksgiving Day Parade in New York City — just as other Goodyear-built figure balloons have highlighted this annual event for 22 years.

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OTHER PUBLICATIONS . . .

American Aviation Daily, a daily news service for the entire industry, \$500 per year. Managing Editor: Keith Saunders.

American Aviation Directory, twice yearly listing of publications and organizations, \$7.50 each. Managing Editor: Marion E. Grambow.

Official Airlines Guide: Monthly publication of airline schedules and fares, \$13.50 per year in U.S.A.; \$14.00 in Canada. \$11.00 per year in U.K. Published from 139 N. Clark St., Chicago 2, Ill. Central 6-5804. Managing Editor: Robert Parrish.

American Aviation News (incorporating Air Traffic Reports): Daily rates and tariff news, \$1.50 per year. Managing Editor: Wallace I. Longstreth.

When & Where

Nov. 30-Dec. 1—Fifth Annual Air Cargo Days, American Society of Mechanical Engineers, Annual Meeting, Statler Hotel, New York City.

Dec. 1-2—Frequency Responses Symposium sponsored by the American Society of Mechanical Engineers, Hotel Statler, New York City.

Dec. 1-2—ASME, 2d Annual Heavy Press Program, Statler Hotel, New York.

Dec. 3-5—7th annual Arizona Aviation Conference, Yuma, Ariz.

Dec. 15—Air Transport Association, Board of Directors, Sheraton-Carlton, Washington, D.C.

Dec. 16—Air Transport Association, Membership Meeting, Sheraton-Carlton, Washington, D.C.

Dec. 17—17th Wright Brothers Lecture (sponsored by IAS), U.S. Chamber of Commerce Auditorium, Washington, D.C.

Dec. 17—Wright Brothers Memorial Dinner, sponsored by Aero Club of Washington, Statler Hotel, Washington, D.C.

Jan. 25-26—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. Conference at Conrad Hilton Hotel.

Jan. 25-29—Institute of the Aeronautical Sciences, 22d Annual Meeting, Astor Hotel, New York.

Jan. 25—IAS, Honors Night Dinner, Astor Hotel, New York.

Feb. 3-5—Society of Plastics Industry, 9th Annual Division conference on reinforced plastics, Edgewater Beach Hotel, Chicago.

Apr. 12-14—Airport Operators Council, 7th Annual Meeting, Tampa, Fla.

Apr. 12-15—Society of Automotive Engineers, Aerodynamic Meeting, Production Forum & Aircraft Engineering Display, Statler Hotel, New York.

Apr. 12-14—Airport Operators Council, 7th Annual Meeting, Tampa, Fla.

Apr. 29-30—American Society of Tool Engineers, 10th biennial industrial exposition, Convention Center, Philadelphia.

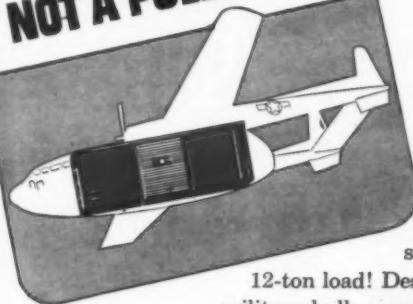
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Letters

Letters should be addressed to The Editor, American Aviation Magazine, 1025 Vermont Ave., N.W., Washington 5, D.C. Anonymous letters will not be printed, but names will be withheld upon request.

WIN, PLACE, AND NO-SHOW

To The Editor:

We in British European Airways read with great interest your article in the October 12th issue, about the "no show" problem.

Together with most of the European carriers we are, of course, all plagued with this problem in Europe—but here is a new one!

Last week our friends Aer Lingus, for whom we act as agents in the U.K., had a horse that "no showed"—3 horses were booked—only 2 turned up! One can hardly blame the horse. Is there a moral to this story?

C. E. M. ADAMS

General Sales Manager
British European Airways
London

BY ANY OTHER NAME

To the Editor:

Looks like we both stirred up something unintentionally, because of an accidental similarity of names. My letter on page eight of your October 26 issue discusses a letter which originally appeared on page nine of September 28 issue by one W. W. Andrews. The boys over at the Civil Aeronautics Board tell me that they are getting a lot of mail

on the assumption that the W. W. Andrews is actually W. K. Andrews, director of the Bureau of Safety Investigation on the Civil Aeronautics Board.

As you know—and as your September 28 issue pointed out—the Andrews who wrote you the letter originally has almost but not quite the same initials, and lives in Chicago, and not in Washington. I understand that this coincidence has given the CAB's Bill Andrews some unpleasant moments recently. Hope you can correct the erroneous impression.

MAX KARANT

Assistant General Manager

Aircraft Owners and Pilots Assn.
P. O. Box 5960
Washington 14, D. C.

AOPA AND AIRLINES

To The Editor:

Many thanks for the kind words on AOPA's Anticol in your November 9 issue. I hadn't heard of the "how-to-prevent-forest fires" gimmick before, but it's a good one.

The last sentence of your editorial reflects a conception we've been trying for some time to correct. You say: "We trust AOPA has taken into full account in its drive against airline interests . . ."

Please! AOPA never has had, and does not now have, a "drive against airline interests." As a matter of fact, we are nearly five years late in coming out

into the open in our position against the proposed high-density terminal area, and all it stands for. Anticol was just as important then as it is now. But AOPA's tardiness has been by choice—our choice. We have never wanted an open, public controversy with the airline people. We have always admired and respected them, and have done our level best to get along with them.

Individually, we have had nothing but the finest cooperation from such companies as Pan American (who are especially helpful to AOPA members flying throughout Latin America), TWA (whose pilot courtesy card has been in the hands of every AOPA member for many years), and others. Just the other day Lake Central went out of its way to be helpful—and at the very airport (Richmond, Ind.) where one of their DC-3's and a Cessna 170 not long ago had a fatal collision in the traffic pattern.

We have always tried to settle our differences with airline people around a conference table. We think it hurts civil aviation for two segments like ours to get into public fights. That's why we spent some five years trying to keep quiet about the high-density terminal area proposal, which was fanned and fostered by airline people both inside and outside the government.

We had no alternative but to fight back publicly when those interests rammed through a sweeping proposed new regulation, one which we firmly believe will drastically harm all civil aviation—except the airlines and some

(Continued on page 37)

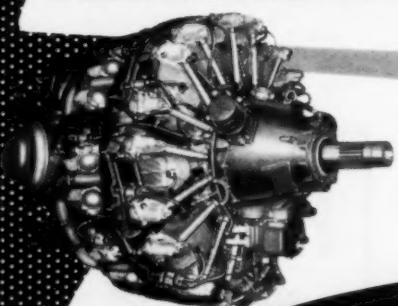
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EDITORIAL

Will The 'Look' Be New?

Within the next few months the "new look" at the nation's defense program, promised by the new Administration, a new Joint Chiefs of Staff, and a new civilian command at the Pentagon, will have been revealed for all to see.

Will it be a re-hash of traditional methods, a compromise of rival services toward "balanced forces," and a strategy based on the weapons of the last war? Or will it be a bold and imaginative new strategy of defense based on the tremendous advances of the past 10 years? The answer should not be long in forthcoming.

by
W. W. P.

It is difficult to make superlatives understood and appreciated. It is difficult to translate the incredible advances of the past decade into the realities of planning for tomorrow. It is extremely difficult to loosen the shackles which bind men to habit and tradition. Yet this country must break from its past concepts of defense or face a grim future.

Last spring Mundy I. Peale, president of Republic Aviation Corporation, gave a thought-provoking address which contained the following:

"The combination of airpower with atomic weapons casts a shadow over the life of every man and woman on earth. The advance of airpower itself has strained our capacity for belief. The advance of atomic research which parallels it is almost beyond belief."

Do We Understand?

Read it again. It says a lot. The words are simple and the message is concise and direct. Everything Mr. Peale says is absolutely correct. But do we in this country begin to have even an elementary understanding of what the airpower-atomic age really means? More important, has Pentagon thinking oriented itself fully to the facts of this new day?

It is ironical that the best primer today for this nation's new defense was written by a ground forces man. Brig. Gen. Bonner Fellers, U.S. Army, Ret., has authored "Wings for Peace," a very unimaginative title for such a dynamic product. It appeared last April and is published by the Henry Regnery Company of Chicago (\$3.00). This book needs to be read by millions. It needs to be read by everyone in aviation and by everyone in the Pentagon. It is convincing, persuasive, shocking. General Fellers is one Army man who thinks and writes articulately about air power.

Now that this country is at the peak of its rearmament program, where do we go from here?

Is there to be a decline to another disastrous and costly stagnation? Will we fritter away the ensuing defense budget by continuing to spend money on obsolete equipment and antiquated weapons and useless ground installations? Or will we utilize the defense money toward building the only kind of defense possible for the airpower-atomic age?

Bonner Fellers has provided in "Wings for Peace" a devastating analysis of NATO and of the now-passing policy of containment against our only major antagonist, Russia. NATO has been shaky (and costly) from the start. It is a morbid hangover of the last war, created on the ashes of ground force movements and rigid lines of defense made completely obsolete by the airpower-atomic age.

Futility of NATO

"The atomic explosion in Russia accentuated the futility of the NATO ground defense concept," he writes. "The explosion should have prompted our Joint Chiefs of Staff to switch immediately from reliance on ground combat to a determination to create American global air supremacy.

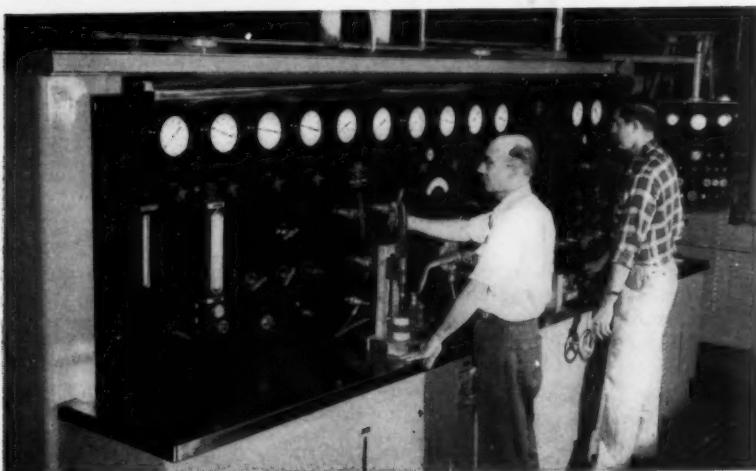
"From the moment of this atomic explosion, the static defense of Europe became utterly impossible. The presence of American troops on Europe's frontier became ridiculous so far as their extending security to Europe and the United States was concerned."

These are strong words and there are many more like them. If an Air Force officer had said them the officer would be immediately accused of being a crusader or a special pleader. But Bonner Fellers is a product of ground force training. He served in the Pacific. He saw what air power accomplished.

What he might have added to his book was how World War II might have turned out had it been fought with the weapons which became available during the latter part of the war and in the eight years since, but which the Germans and the Japs didn't have. What then of the D-Day invasion of Normandy? If the Germans had had block-busters and napalm, to say nothing of A-bombs, instead of puny 500-pound explosives, General Eisenhower would not have been able to build up a tremendous ground force in England for a formal traditional-type invasion of Normandy.

World War II planning and preparation went on virtually without any aerial or other opposition. The weapons available to Germany and Japan were inconsequential compared to the terrifying materiel available today to both the U.S. and Russia.

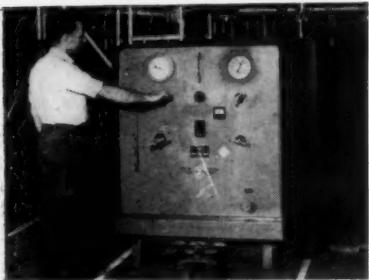
Major Alexander P. de Seversky is often characterized as a special pleader. Clean-shaven, white-collared Naval reservists and pin-striped-suited former



Greer Jet Engine Fuel System and Pump Test Stand, shown here in Boeing's Wichita plant, is used to test fuel pumps and fuel system accessories used on the stratojet engines.

How Boeing Checks Stratojets with Greer Test Equipment

The photographs on this page show four typical scenes in Boeing's test department. We could show you dozens more. All these shots have one thing in common. The test equipment shown in use is made by Greer Hydraulics.



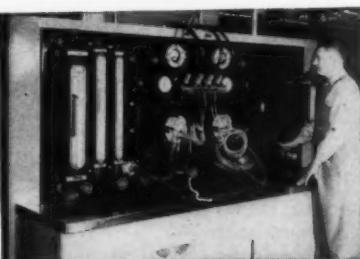
Greer Portable Hydraulic Test Machine provides hydraulic test fluid for checking hydraulic systems of modern aircraft.



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Greer Fuel Booster Pump Stand provides dual sumps and test chambers so run-in and performance testing can be accomplished on two components at one time.

Greer Hydraulics Inc. 454 Eighteenth Street, Brooklyn 15, New York

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2832 East Grand Boulevard, Detroit, Michigan • and sales representatives in all principal cities

Army captains like to write letters to the editor on tiny points of obsolete strategy in an effort to pick holes in Seversky's arguments, but it would be difficult indeed for anyone to argue with what Seversky said in a New York speech early this month:

"We must adopt a realistic strategy within the limitations of our manpower and resources. And in this atomic age there is only one strategy that we can implement: it is the strategy based on invincible air power. As long as we persist in our present profligate strategy of balanced forces, we are rearming for certain defeat."

"Our military leadership has once again fallen into the historical error of trying to fight the next war with methods and weapons of the past . . . It is not the stockpile of atomic bombs that will be decisive, but the superior means of delivery. That means superior air power."

The extent to which the new Joint Chiefs of Staff measure up to the planning required for the airpower-atomic age is being awaited with much interest.

More on CAB

Further to our comments in this space last issue that the Civil Aeronautics Board is in trouble, the outlook now is for an un-hurried appraisal of the CAB difficulties by the White House, with no developments expected until after January 15, following the customary Presidential messages to Congress. Contrary to a multitude of rumors current in the capital, no action either for removal of members or for reorganization is imminent.

What seems to be certain, however, is a major reorganization of the CAB sometime shortly after January 15. This would be by Presidential order which will become effective unless Congress vetoes the plan within 90 days. It is understood that the White House staff has not reached any final conclusions about the CAB's destiny—only that it needs to be re-shaped. Suggestions are being sought from many sources. It is good to know that a thorough review is being made before action is taken.

. . . WAYNE W. PARRISH.

AMERICAN AVIATION

Industry Spotlight

Unofficial reports from engineering representatives who visit Boeing at Seattle claim that the company will ask about \$4 million for the Model 707 jet transport and that this would permit a break-even point at 40 aircraft. Break-even number appears in line with general estimates of the market for an aircraft of this size.

The word in helicopter circles is that Sikorsky's folding rotor convertiplane design has not been dropped for good. U. S. Air Force, which failed to issue Phase II contract to Sikorsky when such contracts were issued to McDonnell and Bell, has simply delayed the Sikorsky Phase II by one year until additional funds are available.

Although nothing is definite, Westinghouse would like to combine all jet engine production at its Kansas City plant, thus phasing out jet output at Lester, Pa., near Philadelphia.

Lockheed's forthcoming C-130A four-engine freighter, using Allison T56 turboprops, will cruise at about 390 miles per hour.

Specific fuel consumption of the Wright J67 Olympus (15,000 pounds thrust) is reportedly 0.8 pounds per pound of thrust per hour.

Production of Hytrol, the brake system device manufactured by Hydro-Aire which cuts skidding by preventing wheel locking, is now running 400-600 units a month. USAF has adopted Hytrol for both the Boeing B-47 and B-52 bombers. Northwest Airlines experience with Hytrol, proving the device a big help in eliminating tire flat-spotting, is causing other civil operators to take another look at its possibilities.

An insight into Britain's experience with aircraft lead times, from the conception of the design to deliveries of aircraft, is offered by the recent remarks of Lord de L'Isle and Dudley, British Secretary of State for Air: "In the case of the Canberra . . . the time between the date of development contract and the first delivery to the RAF was five years and five months. With the Hunter . . . the comparable time will be five years and nine months. With the Valiant . . . six years and five months."

The U. S. Navy and Sperry Gyroscope Co. have disclosed the development of a new type of gyroscope, given the trade-mark of "Gyrotron," which consists of small electrically-driven tuning forks sensitive to a wide range of turning motions. About a dozen Gyrotrons have been built and one is now being flight tested in a new automatic pilot aboard a Navy aircraft operating out of MacArthur Field, L. I.

A Fairchild C-119 has been equipped with a probe-and-drogue refueling system by Flight Refueling, Inc., of Danbury, Conn., and experiments are underway in the USAF using the Flying Boxcar as a refueling tanker.

Link Aviation Corp. is reported ready to build 20 twin-engine electronic trainers under a \$3 million contract with Pan American World Airways and American Airlines. Negotiations for 10 of the trainers by each of these lines are in the final stages of negotiation.

INDUSTRY MISCELLANY

USAF has now acknowledged that the Pratt & Whitney J57 engine, which powers the Boeing B-52, Convair F-102, and North American F-100, has an official rating in the 10,000-pound-thrust class . . . American Helicopter Society has enrolled its 1000th member . . . Convair delivered 14 Convair transports during October, bringing total delivered to 124; total sold is now at 195 . . . Allison's Convair Turbo-Liner, which now has latest model T38 engines installed, has close to 250 hours of flight time . . . Second Convair YF-102 is scheduled for delivery to USAF in early December . . . USAF and MATS studies visualize a 625 mph cargo-passenger airplane by 1960.

Reversing the usual procedure of inserting a semi-close tolerance fastener into a close tolerance hole-

the HS51P-52P series

HI-SHEAR rivet

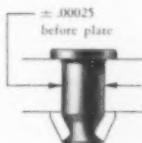
with a close tolerance

shank, fits into a

semi-close tolerance

hole, pilot and

core drilled.



This easier made

hole



hole

This easier made

hole

reduces
installation
costs

Additional savings are realized in less drilling skill needed, equipment and inspection.

The head shaving operation, to achieve surface smoothness, is eliminated by installing this close tolerance

head style

HI-SHEAR into a

properly prepared

countersunk

or dimpled hole.



160,000-180,000 psi heat treat-
lead chamfer to aid interference fit-
cadmium plated after grind to
prevent corrosion.

Write for the HI-SHEAR Standards
Manual and Drafting Template.

U.S. and Foreign Patents - Trademark Registered



RESEARCH KEEPS

B.F. Goodrich

FIRST IN RUBBER



New De-Icers work faster to keep wings ice-free

THE RUBBER STRIPS seen around the leading edges of the wing above are B. F. Goodrich De-Icers. They are made with five wide tubes that inflate and deflate, effectively break off ice on planes like this TWA Constellation.

To give this protection to today's bigger...and faster planes, B. F. Goodrich years ago started testing hundreds of De-Icer designs under the toughest weather conditions. This included icing tests in actual service over the north Atlantic. So when the Navy needed special De-Icers for fast fighters for Korea, B. F. Goodrich was able to design, test and produce them in 21 days.

The latest BFG De-Icer development is the one with narrow $\frac{3}{4}$ " tubes, now

used on TWA and Eastern Airlines Super Constellations. These little tubes inflate quicker with almost three times the air pressure used on earlier types. This breaks off ice cleaner and faster. The rest period between inflating cycles is much longer, cutting down disturbance of the airflow so much it isn't even a factor. This new De-Icer is lighter—takes up little space for plumbing.

Airlines report that these De-Icers last twice as long, too. That's because they're molded to fit, simply cemented onto the plane with no stretching, no tension.

First developed by B. F. Goodrich, De-Icers have given the airlines year-

round protection against icing conditions since 1930. B. F. Goodrich engineers have the longest, most complete background of experience in the field of airplane ice protection. Let them put this experience to work for you.

Other B. F. Goodrich products for aviation include: tires, wheels, brakes; heated rubber; Avtrim; Plastilock adhesives; Pressure Sealing Zippers; canopy seals; fuel cells; Rivnuts; hose and other accessories. *The B. F. Goodrich Co., Aeronautical Division, Akron, Ohio.*

B.F. Goodrich

FIRST IN RUBBER

AMERICAN AVIATION

ESTABLISHED JUNE 1, 1937

VOL. 17 NO. 13



OFFICIAL DRAWING of the Boeing 707, scheduled to fly in less than nine months.

First Details of Boeing 707 Jet Transport

Four-engine jet will have a turboprop version as one variation; seating to range from 80 to 121.

By WILLIAM D. PERREAULT

THE BRIGHTEST SPOT in the long lagging U. S. jet transport picture is Seattle, Washington, where work is progressing ahead of schedule on this country's first jet transport prototype. There in Seattle the Boeing Airplane Company has joined the wings and fuselage of its four-engine jet transport, the Boeing 707, and the plane is scheduled to fly in less than nine months.

Officially little has been said about the Model 707. Boeing is in the unique position, among U. S. transport manufacturers, of being well along on construction of a military/civil tanker-transport aircraft for which it has no customers. It has had a completely free hand in the entire design of the new aircraft.

Both military and civil interest in "Project X," as Boeing often refers to the aircraft, is rapidly mounting. Rumors keep cropping up of a U. S. Air Force contract pending for a tanker

version of the aircraft to be used as a refueler for the new "100 series" supersonic fighter aircraft. Rumors of airline negotiations with Boeing also exist.

Actually Boeing officials are playing the role of a poker player who knows he has all the cards that count in his own hand. Even airlines with legitimate interest in the 707 haven't been able to get a price on the jet transport. It is reasonably certain that no airline is going to order a production aircraft until the prototype has flown. Boeing can afford to play its civil cards close to its chest.

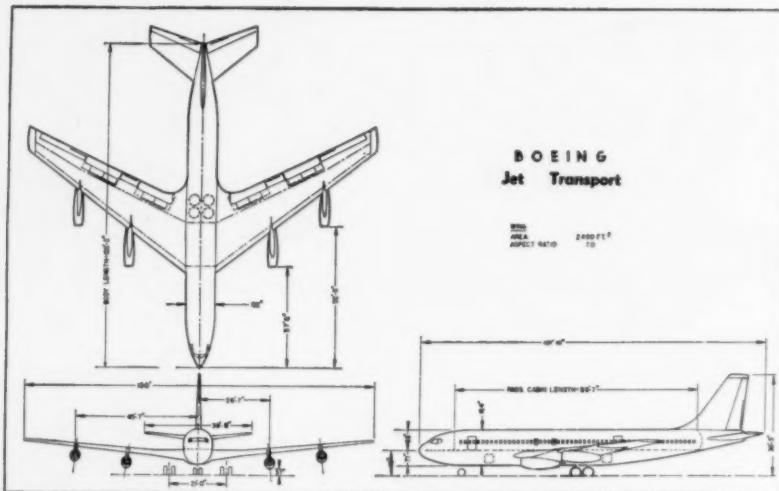
This is not equally true of its military cards. The USAF is not convinced of the need for a jet refueler, at least not on the level where it counts. Furthermore, every major aircraft manufacturer has submitted design proposals for such a tanker to the USAF. The initiative shown by Boeing in designing and building its own prototype may be a deciding factor. But Boeing isn't resting on this possibility. It's making a determined sales effort.

Specifically, what is Boeing selling? The Boeing 707 which will fly next year is a four-engine jet transport powered by four Pratt & Whitney JT3L engines. This is the Model 707-7-18. There are other active proposals being submitted to the U. S. Air Force, minor variations of this model, but the principal alternate is a turboprop-powered version with four Curtiss-Wright T47 engines.

The Model 707 is a big airplane, grossing 190,000 pounds. Its span, effectively reduced by the 35° sweep of the wings, is 130 feet, just 11 feet short of the Boeing Stratocruiser's span. Its length of 127 feet, 10" is 17½ feet more than the Stratocruiser's and its height is the same, at 38 feet 3". Its empty weight is projected at 88,890 pounds.

Essentially the Model 707 can be called a 100-passenger aircraft. Its 835 square feet of cabin floor area make it a versatile aircraft. Seat installations varying from 80 passengers in a de luxe interior to 121 in a six-abreast seating arrangement are feasible.

If desired, constant section lengthening of the fuselage, fore and aft of



BIG BROTHER to the Boeing Stratocruiser, the Model 707 jet transport has a span 11 feet shorter than the B-377; it is same height, but 1½ feet longer.

the wing, can be built in to boost passenger capacity to 130 in a five-abreast seating arrangement.

Each of these arrangements—four, five, or six seats abreast—is relatively roomy by today's standards. This is made possible by the fuselage width of 132" (DC-7 is 129 inches and Super Constellation is 127 inches) and cabin length of 89 feet 7". In the 121-passenger version the triple seat units include two with shoulder widths of 17½" and one of 18". Center aisle width is 16".

To move the Boeing jet along at its cruising speed of 500 miles per hour will take a lot of power and fuel. The Pratt & Whitney JT3L engines are reportedly rated at 10,000 pounds static thrust. Boeing projects its cruising speed on the basis of 80% of the engines' normal rated power. This reduction in cruising power should improve engine reliability and cut operating costs.

The fuel for the Model 707, either JP1 or JP4, is stored in eight integral wing tanks, exclusive of the center-section, and totals 13,680 gallons or 88,920 pounds (6.5 pounds per gallon). The centersection could hold another 4200 gallons. Each of the four main tanks is provided with fuel dumping provisions. Fuel can be fed from tank to engine, manifold to engine, or tank and manifold to engine.

The cockpit arrangements on the Model 707 are very much like those of the Boeing Stratocruiser. They provide for a pilot, co-pilot, and flight engineer and space provisions for a navigator. The flight engineer station, behind and between the two pilots, has separate throttle controls.

For operational purposes there are two versions of the civil transport, the domestic and overseas versions. The

domestic model will carry a payload of 30,000 pounds 2300 miles. At longer ranges this is reduced by increased fuel loads so that at 2800 miles this model's payload is reduced to 20,000 pounds. The overseas model will carry 30,000 pounds 1700 miles before fuel requirements cut into payload.

Cruising speed is cited as 434 knots, or about 500 mph. The long climb and descent procedures translate this cruising speed into a block speed of 380 knots (437 mph) for 1200-mile flight segments, 405 knots (466 mph) for 2000 miles, and 410 knots (472 mph) for 2500 miles.

Stall speed at 190,000 pounds gross is 136 mph with 30° flap, the take-off condition. On landing, using 50° flap and 160,000 gross, stall speed is about 116 mph.

Smooth Sailing

The history of high speed jet aircraft has been spotted with recurring reports of extreme roughness encountered in flight, often attributed to "clear air gusts." Boeing engineers therefore created the "roughness factor."

σ V MW E
W/S

From a gust response standpoint, Boeing reports, the jet transport is better, represented by a lower roughness factor, than the conventional transport:

Airplane	Boeing 707	Present Transport
Weight (lb.)	155,000	130,000
Airspeed V (k)	450	260
Altitude (ft.)	35,000	20,000
Slope of life curve (Mw)	5.50	5.73
Wing loading W/S	65	76
Elasticity Factor E	.75	1.0
ROUGHNESS FACTOR 8.9		10.5

Take-off distances over a 50-foot obstacle range from 5200 feet at 160,000 pounds gross weight to 6400 feet at 180,000 pounds and 7900 at 190,000 pounds take-off weight. Landing runway requirements range from 6700 feet at 140,000 pounds to 6000 feet at 125,000, and 4400 feet at 100,000 pounds.

To provide passenger comfort at high cruising altitudes and during the rapid climb and descent, the Model 707 will be pressurized to 8.6 pounds differential pressure providing 7000-foot cabin altitude at a 40,000-foot altitude.

Pressurization air may be bled from the engine or generated by engine-driven compressors. In either case pressurized air will be routed to dual air conditioning packs which control the air temperature. Inward-opening doors and windows, plus double pressure-carrying members in the windows, protect against rapid depressurization.

Initial cruising at full gross weight starts at approximately 35,000 feet altitude, and the plane climbs steadily as fuel is burned off to over 40,000 feet. On the domestic version a fuel reserve of 12,000 pounds, enough for 260 nautical miles plus one hour continued cruise, is used. The overseas version assumes a 24,000-pound fuel reserve or enough for three hours cruise.

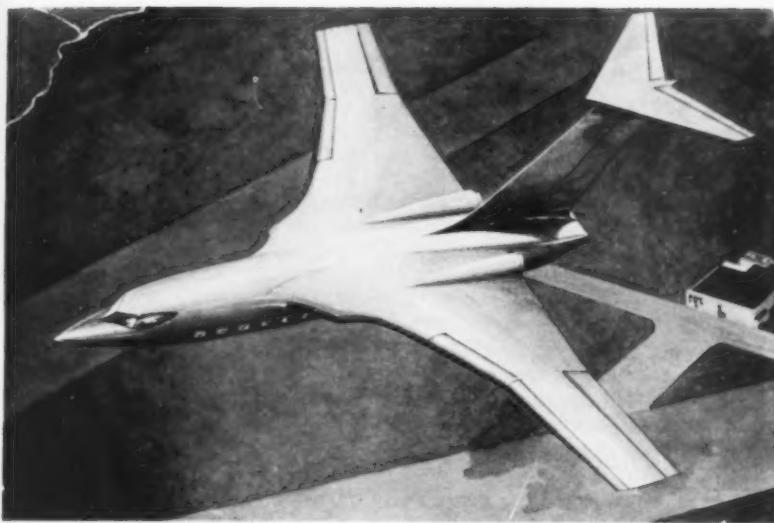
Normal descent would be made with all four engines at idle speed and a rate of descent of 1200-1500 feet per minute with body attitudes ranging from three to five degrees. In an emergency descent rates as high as 8,000/12,000 fpm would be required and body attitudes as steep as 30°.

Other interesting features of the Boeing 707 include:

- **Landing gear:** Main gears use four-wheel trucks mounted on a single oleo. Gear retracts inboard and is housed in lower lobe of the rear main wing spar. Footprint pressure is reported to be 80/90% of present transport types. Forward retracting nose gear has 55° steering. Gear doors retract into closed position when gear is extended. Gear retraction time is 10 seconds.

- **Control systems:** Ailerons are split, with outboard section used only at low speeds and locked out when flaps are retracted. Inboard section operates at all speeds. Just forward of each flap section hydraulically operated spoilers are installed on the upper wing surface to improve lateral control and aid in deceleration. Double slotted flaps, split on each side to avoid engine exhaust, are provided.

- **Tail surfaces:** An electrically operated adjustable stabilizer and elevators are used for trimming. Vertical member can be folded downward for hanging aircraft.



Latest U. S. jet transport proposal, Fairchild's M-186B, would use two Wright J67 engines, and would employ a cusp wing embodying some of the features of both delta- and straight-wing configurations. Fairchild this week sought airline industry reaction to the 563 mph jetliner. Shown above is an artist's conception. For details see story on page 20.

West Coast Strike Threats Fading

The possibility of a shutdown of a major segment of the west coast aircraft industry faded last week, but members of the United Auto Workers-CIO, who quit work at North American Aviation plants in Los Angeles, Columbus, and Fresno when the contracts ended October 22, were still out, demanding a wage boost of 23¢ an hour.

Despite similar contract terminations at Douglas and Lockheed plants, members of the International Association of Machinists-AFL refused to go out on the picket lines.

• At El Segundo, Machinists voted to accept a Douglas offer of five cents an hour and other benefits, and a new one-year contract was signed. A year earlier, IAM workers at El Segundo struck for three weeks.

• At Santa Monica, IAM members turned down an identical offer by Douglas but refused to authorize a walkout. In 1952 it was Douglas-Santa Monica Machinists who first accepted a company wage proposal.

• At Burbank, IAM members rejected a Lockheed offer very similar to that made by Douglas. They too, however, failed to give IAM leaders the right to call a walkout. Wage talks were continued on a day-to-day basis.

In the UAW-NAA dispute, Federal Mediator John Fenton succeeded in setting up a series of company-union talks, but both sides held firm and the

negotiations were temporarily discontinued. The company claimed, however, that at least 6000 of the 33,000 who originally went out on strike had returned to their jobs and accepted the NAA proposal for a four per cent hike and other benefits.

Meanwhile 1500 members of the AFL-Brotherhood of Railway Clerks struck Northwest Airlines and caused minor breaks in NWA service. After five days both sides agreed to arbitrate and the walkout ended.

Government to Charge Industry for Licenses

The government plans to impose fees for all types of licenses issued to the aviation industry, and agencies have been instructed to draw up lists of "fair and equitable" charges by next February 1.

This is part of a Bureau of the Budget plan, authorized under Title V of Public Law 137, 82nd Congress, to charge all types of industries for licenses. The law also provides fees for any kind of government service, but only the license provision will be put into effect now.

Under the new system, airlines may be charged for filing applications with CAB, for issuance of certificates of convenience and necessity, foreign air carrier permits, etc. CAA will probably

establish fees for airman certificates and aircraft airworthiness certificates. The Federal Communications Commission is to charge for radio operators' licenses.

The CAB, which estimates its annual licensing costs (including hearings and other procedural steps) at \$600,000, is lukewarm to the plan. It doesn't believe it could collect more than \$50,000 from airlines and still keep charges reasonable.

In addition to specific fees, the Budget Bureau believes general fees may be imposed, such as an annual "registration" charge, based on business volume, revenue, etc. CAB, however, doesn't think it has power to impose general fees without new legislation. It also doubts the wisdom of charging subsidy carriers, who will have to apply for increased government assistance to cover the cost.

The CAA already collects for registration and recording of aircraft. Even before the Budget directive, it was considering charges for airman and aircraft certificates and is now expected to establish them.

After lists of fees are drawn up, affected parties are to be given opportunity to comment.

Industry Urges

More Titanium

Top executives of the aircraft manufacturing industry appearing before the Senate Interior and Insular Affairs Committee early this month urged as a body that the production of titanium be expanded. Donald W. Douglas, president of Douglas Aircraft Co., said there was no question that titanium must be produced in greater supply.

Convair's vice president, Thomas G. Lanphier, Jr., estimated that his company will use up to 40% titanium in future military aircraft. Robert E. Gross, president of Lockheed Aircraft Corp., and J. L. Atwood, president of North American Aviation, also appeared before the committee and stressed the importance of the wonder metal in today's aircraft production.

Committee chairman George Malone (R., Nev.) told the manufacturers that two titanium plants, one in New Jersey and another in Henderson, Nev., have contracts for production of 10 tons daily each, but thus far have only been able to turn out four tons each per day.

Malone was advised that the aircraft industry would need roughly 250,000 tons of titanium annually if asked to produce 50,000 planes a year as in World War II.

ACC Approves Policy Review Agenda

Thirty-five items in nine fields of aviation have been approved by the Air Coordinating Committee for consideration in its forthcoming air policy review, ordered by President Eisenhower.

As expected, almost all of the subjects deal with civil aviation, with only a few touching on the military. ACC, headed by Robert B. Murray Jr., Under Secretary of Commerce for Transportation, has invited industry comment on the agenda, which follows:

- **Air Transport** (domestic and international): (1) airline subsidies—"direct federal aid in relationship to industry's present stage of development and the over-all fiscal policies of the Administration"; (2) role of U.S. air transport system; (3) non-scheduled operations; (4) policies and standards to be used in establishing air route patterns; (5) movement of mail by air; (6) cargo operations and development; (7) government use of military and commercial air transport; (8) air transport mobilization planning.

- **Airports**: (1) continuation or amendment of existing Federal aid program; (2) review of recommendations of President's Airport Commission (Doolittle Report); (3) joint civil-military use of airports; (4) U.S. use of foreign airports.

- **Airways**: (1) user charge policy domestic and international; (2) development and implementation of a domestic and international common civil-military system of airways facilities and services; (3) review of domestic airways in terms of division of responsibility among Federal and local government and industry; (4) aeronautical communications.

- **International Aviation**: (1) provision of air navigation aids; (2) exchange of air transport rights; (3) establishment of fares and rates—U.S. legislation and U.S. government relationship to IATA; (4) ICAO's role and U.S. participation in ICAO; (5) simplification of entry and exit requirements; (6) economic aid and technical assistance—action in multilateral (ICAO) and bilateral fields.

- **Aircraft and Equipment Manufacture and Sale**: (1) government's role in development of new transport planes; (2) sale of U.S. planes and equipment abroad; (3) sale of foreign planes and equipment in U.S.

- **Aviation Safety**: (1) government's role in domestic and international safety; (2) control and coordination of search and rescue.

- **General Aviation**: (1) Development of personal planes with increased utility and operating economy; (2) government's role in training flight and technical ground personnel; (3) government's role in aviation education and information.

- **Federal-State-Local Relationship**: (1) promulgation by states of aviation safety regulations; enforcement by states of Federal regulations; (2) Federal-state relations in economic regulation of air transport; (3) multiple state taxation of aviation operations; (4) exercise of control of airspace among federal, state, local and private interests.

- **Research and Development**: (1) Civil aviation research and development programs.

Charles O. Cary, ACC executive secretary, heads a liaison group to direct conduct of the survey.



Piasecki "Transporter" (YH-16) is shown during one of its first flights. Powered by two P&W R-2180 engines, the rotorcraft is 78 feet long.

Industry Reports to Murray on Airport Aid

Federal aid to airports should continue, although under more stringent conditions: this conclusion is reached in the report by the industry committee appointed by Under Secretary of Commerce Robert B. Murray to study the Federal aid program.

States and local political subdivisions cannot carry the burden of capital investment necessary for providing a national airport network, the report concludes. Some amendments should be made to the Federal Airport Act and program, however, the group adds.

Federal aid should be allotted for the following: land acquisition; runway, taxiway, and ramp construction; lighting essential to safe operation within airport boundaries; non-revenue service type structures, i.e., control towers, buildings for fire, crash, and maintenance equipment; access and service roads within airport boundaries; removal of obstacles on line of approach to airports; clearing, grading, drainage and fencing.

The report advocates the single runway concept for Federal aid "except where traffic requires the construction of parallel runways." The committee does not recommend that "the intersecting type of runway be abandoned hell-mell" but "when maintenance becomes excessive or traffic grows to extreme proportions . . . phasing-out procedures should begin."

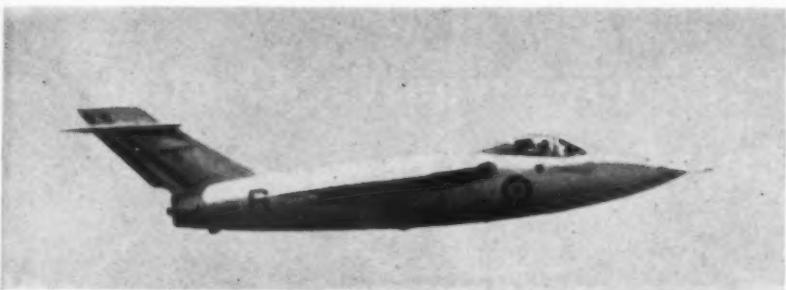
Government participation in airport projects should be based on when such participation best "serves the national interest." No limitations on Federal aid should be invoked because of either class or category of airports.

In discussing responsibilities, the majority of the committee felt that local and state officials should be responsible for selection of individual projects. State and local authorities should also be permitted free rein on selection of sites, in cooperation with Commerce representatives.

Business Won't be Hurt By Defense Cuts: Wilson

Defense Secretary Charles E. Wilson has announced that there is no basis for "rumors that defense spending would be cut to a point where business is affected adversely."

He has set a December 5 deadline for completion of detailed fiscal 1955 budget estimates by the three armed services. It is anticipated the estimates will be ready for inclusion in the forthcoming Federal budget by December 28, 1953.



PROMINENT IN SNCASE'S PLANS for the future is its Baroudeur, the landing-gearless jet fighter which takes off from a dolly and lands on skids.

France's SNCASE: Ready, Willing, Able

Production of Dassault Mysterés and Baroudeurs bolster nationalized firm's confidence in future.

(Editor's Note: This is another in the series of articles on European aircraft companies involved in the NATO plane procurement program by AMERICAN AVIATION's manufacturing editor.)

BY ROBERT M. LOEBELSON

PARIS—The Societe Nationale de Constructions Aeronautiques du Sud-Est (SNCASE), although not a prime contractor in the \$582 million joint program to purchase 1725 modern jet aircraft for NATO and European air forces, expects to perform at least half the man-hours required for the Dassault Mysteré 4A's. The nationalized French firm expects to wind up the Dassault order by the middle of 1956.

Sud-Est president Georges Hereil is equally confident that his firm's own new jet, the SE. 5000 "Baroudeur," will ultimately be ordered not only by the French Air Force but by the USAF for itself and NATO nations. Second Baroudeur prototype is expected to be flying before the end of the year. SNCASE already has obtained a pre-production order from the French government for the landing-gearless aircraft. Testing of the first prototype is continuing at the French Air Force base at Istres, 35 miles northwest of Marseilles.

Although its headquarters are here in Paris, SNCASE's principal factories are located at Marignane (near Marseilles), at La Corneuve, at Cannes on the Riviera, at Toulouse, at Blagnac, and at Saint Martin (near Toulouse). Each facility performs its own specialized operation and, with the exception of the two twin-jet "Caravelle" passenger transports now under construction for the French government at Blagnac and personal aircraft at La Corneuve, virtually all of the work is military.

SNCASE is involved with NATO aircraft in still another way: it holds \$30 million in subcontracts from Republic Aviation-International of Lugano, Switzerland, to produce parts for the Republic F-84's used by the USAF and other allied air forces in Europe. SNCASE officials state that if the USAF should want Republic Aviation's plant at Farmingdale, L. I., to be devoted solely to such aircraft as Republic's upcoming F-103 and F-105 and should still desire either the F-84 or the swept-wing F-84F for NATO use, their company could expand to build either the Thunderjet or Thunderstreak.

The subcontract from Republic is considered a highly important one by SNCASE officials, primarily because no F-84 parts are being built in Europe (except for a pilot line at Finnmeccanica Corp.'s plant in Naples, Italy) and because the Thunderjet is at present the most widely used jet in Western Europe. It is currently operated by the USAF, France, Italy, Belgium, Holland, Denmark, Norway, Greece, Turkey, Portugal, and possibly Yugoslavia and Spain in the near future. Republic has ended production of the F-84 straight-wing model and while many F-84 and F-84F parts are interchangeable, SNCASE is destined to become, for all practical purposes, the sole F-84 parts supplier.

At Marignane, where SNCASE has completed production of about 400 Hispano-Suiza Nene-powered Mistralis and is ready to wind up its deliveries of 80 Sea Venoms (which use the Fiat Ghost engine), the facility is destined to be used solely for F-84 components.

The plant at Toulouse, soon to end output of airframes and other parts for the Dassault MD 450 Ouragan jet fighter, will shortly be given over to

production of Dassault MD 452 Mysteré 2's for the French Air Force and later for the Mysteré 4A for NATO.

By the end of the year SNCASE officials expect to convert the Blagnac facility, now doing assemblies for the Mysteré, to a repair and maintenance base for the French Air Force's F-84's, with the Mysteré assembly work being transferred to the satellite plant at Saint Martin.

SNCASE, moreover, may also end up doing a considerable amount of Thunderjet maintenance work for other NATO air forces at Blagnac, for Republic Aviation-International is trying to line up maintenance contracts from the USAF in Europe for U. S. and NATO F-84's. If the Lugano firm should succeed, SNCASE is confident some of the maintenance would end up at Blagnac under a subcontract.

The Cannes plant currently is given over to production of air-to-air and ground-to-air guided missiles. Two Languedocs and at least four LeO 45's have been modified with radar noses for missile firings and tests of the secret missiles are currently under way at Colomb-Bechar in Southern Algeria.

One other aircraft with which SNCASE has just become involved is the Fouga 170 R "Magister" twin-jet advanced trainer. The recent order from the French government for about 100 of the Marboré-equipped, butterfly-tailed aircraft has resulted in a substantial order for SNCASE to produce the airframes. France is still hopeful of selling the Magister to the USAF, either for itself or for NATO.

Producer of seven giant SE. 2010 Armagnac commercial transports and licensee for production of Sikorsky S-55 helicopters, SNCASE has adequate production space, tooling, and skilled personnel available for large scale production. Georges Hereil puts it this way: "SNCASE is ready if we're needed." • • •

Overseas National Gets Airlift Contract

Overseas National Airways has been awarded an Air Force contract for 60 U.S.-Tokyo trips in the revised Pacific airlift during the next three months.

The airline, which operates four leased AF C-54's exclusively in the lift, earlier had been excluded from the operations, which are gradually being phased out. An Overseas National court suit against AF Secretary Harold E. Talbott over increased rentals of the aircraft was withdrawn shortly after the announcement.

Estimated Revenue Per Mile—Scheduled Flights

TWA-Transcontinental

	Connie Standard		Connie Tourist		1049		All Flights		Av. Earnings Per Mile
	1952	1953	1952	1953	1952	1953	1952	1953	
January	\$2.31	\$2.27	\$2.52	\$2.71	...	\$2.65	\$1.76	\$2.03	Super Connie
February	2.12	2.11	2.53	2.61	...	2.47	1.67	1.91	Standard 3.05
March	2.30	2.28	2.50	2.60	...	2.62	1.78	2.02	Standard 2.99
April	2.45	2.47	2.59	2.72	...	2.81	1.91	2.17	Standard 2.89
May	2.51	2.41	2.68	2.65	...	2.79	2.09	2.12	Martin
June	2.84	2.67	2.97	2.92	...	3.12	2.21	2.31	Standard 1.99
July	2.53	2.32	2.81	2.81	...	2.80	2.05	2.12	Standard 1.99
August	2.64	...	2.86	...	...	...	2.12	...	September
September	2.68	...	2.84	...	\$2.50	...	2.17	...	October
October	2.51	...	2.68	...	2.93	...	2.12	...	November
November	2.21	...	2.53	...	2.62	...	1.99	...	December
December	2.30	...	2.64	...	2.47	...	2.02	...	
Operating Costs:									
Direct	\$1.22	\$1.23	\$1.14	\$1.14	\$1.59	\$1.65	\$1.05	\$1.16	
Indirect .....	...	...	...	...	...	...	.72	.78	
TOTAL							\$1.79	\$1.94	

TWA Adds Up Score on Coach Traffic

Almost half of line's August traffic was coach business; new and more stable traffic keynotes findings.

By ERIC BRAMLEY

TWA, which has converted more of its domestic flights to tourist-type service than any other transcontinental operator, believes that its move is paying off in new business.

Extent of TWA's conversion is shown by statistics for August, a good summer traffic month. The company had 48.5% of its domestic passenger-miles in tourist, against 23.1% for American and 22% for United. For the full year 1953, TWA estimates that 43.5% of its passenger-miles will be tourist.

The carrier claims its statistics show that:

- Tourist service is tapping a new market.
- Its top five Constellation flights (average earnings per mile) are tourist.
- There's a wider gap between per mile revenue and per mile operating costs on tourist than on standard.

• The seasonal dip is less on tourist than on standard.

The TWA tourist service got its start in 1950 in the west, between Kansas City and Los Angeles, where there was a greater difference between air and rail fares than in the east. By narrowing this gap, the company attracted considerable new business; the

passenger traffic of the major competing railroad in the territory has declined ever since. This initial success led to the later expansion.

To support its claim of new markets, TWA points to surveys which show that tourist flights are attracting a different type of business than standard service. In June, for example, the breakdown was:

	Tourist	Standard
Men	49.3%	68.6%
Women	42.5	26.2
Children	8.2	5.2

Compared with the same month of 1952, these figures show a decline in the percentage of men and an increase in women and children on tourist.

Here are TWA's 10 top flights in average earnings per mile (trip numbers have been deleted for competitive reasons) in a recent month:

	Av. Earnings Per Mile
Constellation	
Tourist	\$3.12
Tourist	3.11
Tourist	3.07
Tourist	3.06
Tourist	3.06

	Av. Earnings Per Mile
Super Connie	
Standard	3.05
Standard	2.99
Standard	2.89

	Av. Earnings Per Mile
Martin	
Standard	1.99
Standard	1.99

At present the company has 19 Connies in domestic tourist service (81 seats) and 25 in standard (57 seats). Its Super Connies, none of which is in tourist, have 64 seats for domestic service, while the combination sit up/sleeper version has 48 seats and eight berths.

The accompanying table on revenue per mile versus operating costs for the various types of Lockheed equipment shows that as long as load factors remain high the tourist Connies are the money-makers. In July, for example, revenue per mile on standard Connies was \$2.32 against total operating costs of \$2.01 (using 78c as indirect cost), or a difference of 31c. Constellation 1049 was \$2.80 against \$2.43, a spread of 37c. Tourist Connie showed \$2.81 versus \$1.92, or 89c.

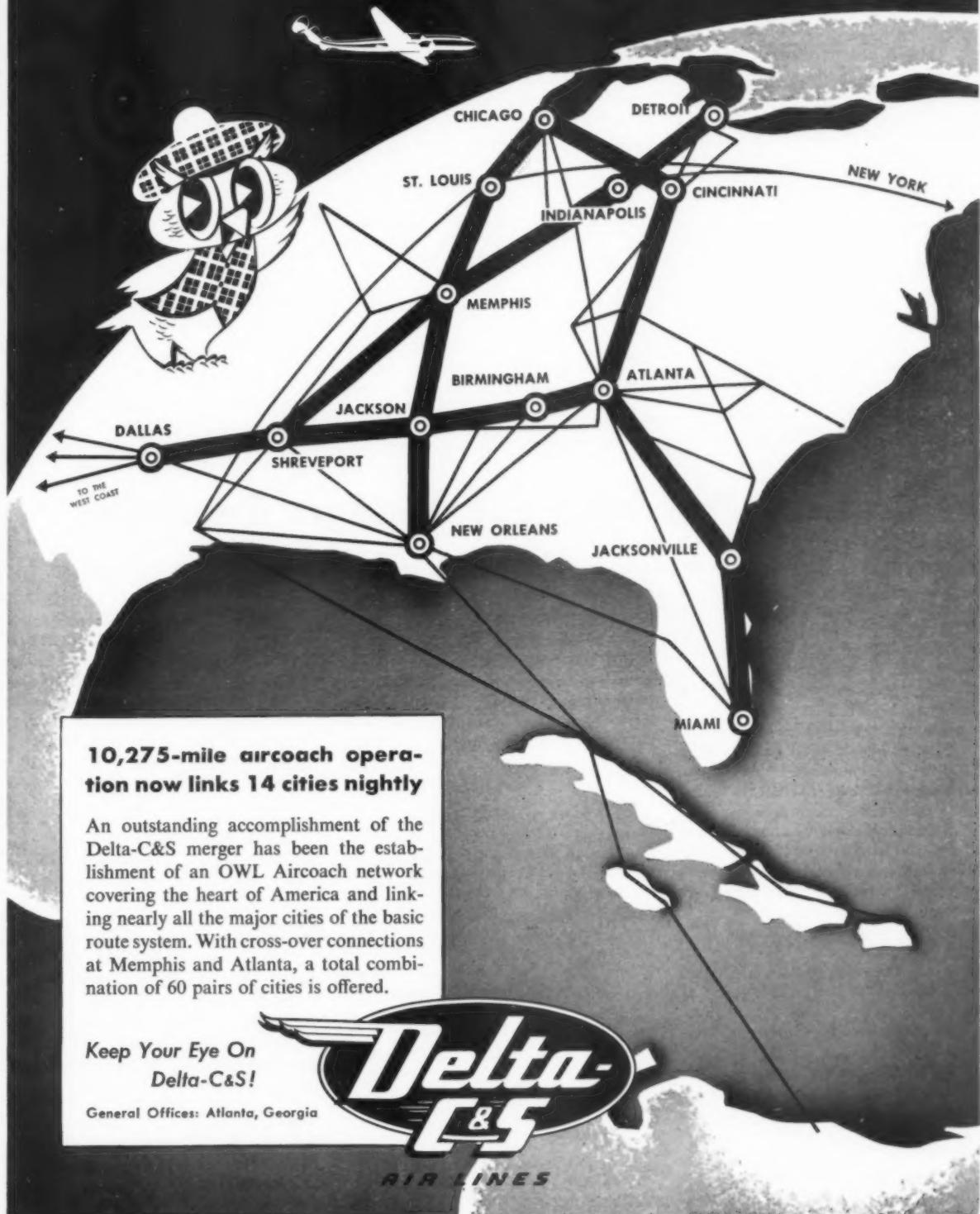
In the first six months of 1953, TWA's load factor on domestic tourist was 81.8% compared with 68.4% standard. In the third quarter the two figures were 83.1% and 68.9%.

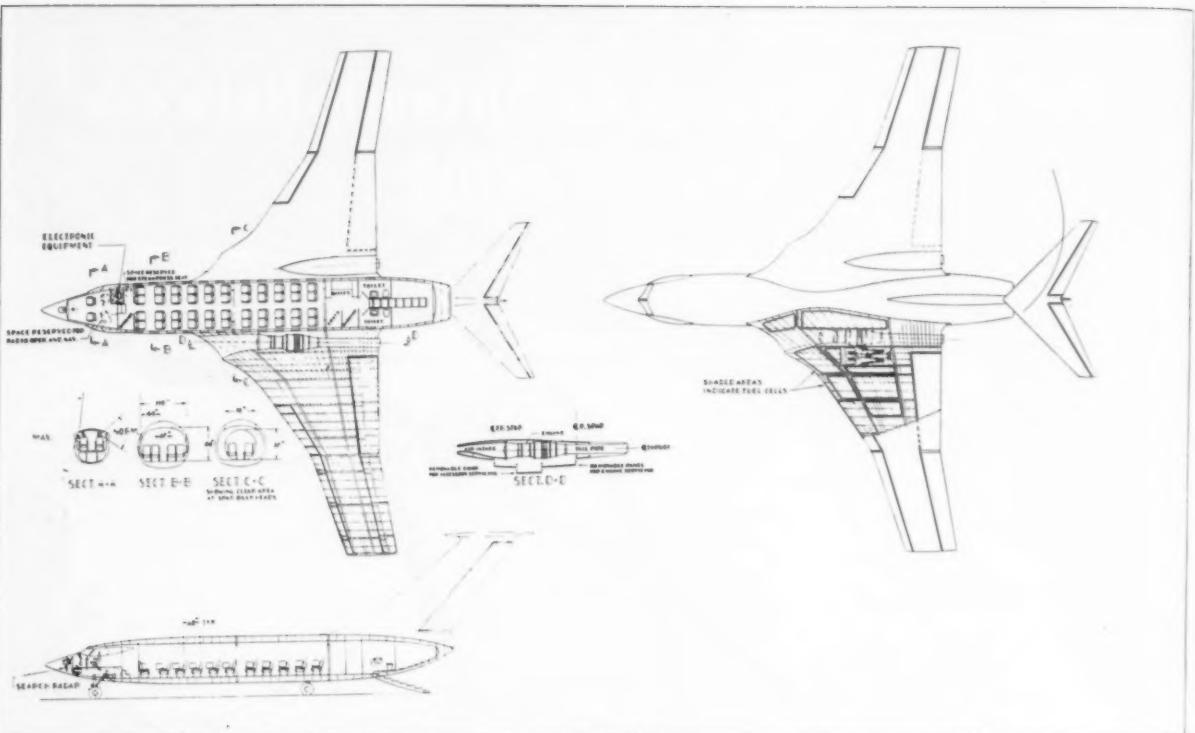
As shown in the table, direct operating costs of tourist Connies are figured to be lower than standard. One of the principal reasons for this is that use of the tourist planes at other than peak hours increases their utilization. It is not believed that there is much difference in indirect costs between the various types of equipment.

The same table shows that tourist revenue per mile had less of a spread between the winter low and the summer high than did first-class. One possible reason advanced for this is that tourist passengers are less affected by weather—if flights are canceled or delayed, these passengers will wait for hours and possibly until the next day. A businessman riding first-class will turn to another form of transport.

TWA has no estimate of what diversion may be from first-class to tourist. In July, however, it checked air travel plan passengers on a standard and a tourist flight leaving New York within an hour of each other. The standard trip showed 22.5% ATPS for a week, tourist 10.8%. However, because of the difference in the loads carried on the two services, the standard percentage represented only 56 passengers while the lower tourist percentage represented 48. Obvious conclusion is that more businessmen are turning to tourist.

Delta-C&S Weaves An Aircoach Network SYSTEM-WIDE





"CUSP WING" possesses advantages of delta and straight designs, Fairchild claims.

Radical Fairchild Jet Design Revealed

FAIRCHILD Aircraft Division this week outlined to representatives of the nation's airlines the Hagerstown, Md., company's entry into the U.S. jet transport sweepstakes, revealing an airplane which is radically different from any other proposed on either side of the Atlantic so far.

Among the differences:

- **Fairchild's M-186B** is a twin-jet airplane. (Only other known two-engine jet airliner is France's SNCASE "Caravelle.")

- The plane features a "cusp" wing, which takes advantage of both the delta and straight-wing configurations. Closest to the M-186B in wing shape is Britain's pure-delta Avro "Atlantic."

- Power plants will be Wright J67's, which by 1958 (when the Fairchild plane might appear) will have a thrust rating of about 15,000 pounds each. All other U.S. jet proposals are wrapped around four Pratt & Whitney J57 engines.

- The gas turbines are buried in the wing roots, whereas the Boeing, Douglas, and Lockheed jet designs have the engines either suspended in pods or back near the tail.

- Price, while not definitely determined pending further studies, will

almost certainly be less than \$2 million per plane, according to chief engineer Walter Tydon.

- Gross weight has been set at 55,770 pounds, with up to 100,000 pounds in the cargo version, the latter configuration carrying up to 35,000

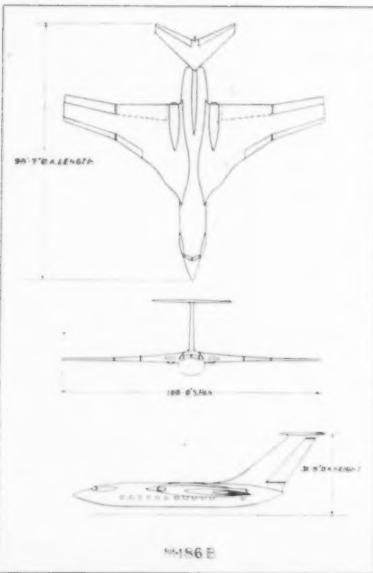
pounds of freight, depending on the range desired.

Range of the M-186B was given by Tydon as transcontinental (New York-Los Angeles) with one stop at Chicago although he indicated it could probably become a transcontinental model (or trans-Atlantic if necessary) by adding external leading edge wing tanks. These tanks, Tydon added, would become practically an integral part of the fuselage and consequently would create practically no drag to slow the plane down.

Cruising speed is given as 563 miles per hour and optimum altitude at about 40,000 feet. Tydon declared there was little point in giving a top speed for the aircraft because at that altitude it would get into the transonic region if it went any faster and the buffeting and other factors which come into play in the transonic range would practically preclude the use of any higher speeds.

The M-186B is designed to carry 44 passengers in the first class version and up to 64 as in aircoach model. Added passengers for the higher-density model would be included by shortening the leg space behind each seat, rather than by going to the more-commonly-utilized five-abreast seating arrangement.

High wing features of the Fairchild



jet. The window adds safety and avoids objects and the plane.

The engine, airline, and sentinel said the operator gave the foot required the 50

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News Briefs

jet, Tydon indicated, would give all windows full view of the ground. In addition, the high wing gives an added safety feature, first because the jet intakes are also mounted high (thus avoiding the possibility of persons or objects being sucked into the engine) and the jet outlets are far enough up to prevent excessive damage to runways as a result of exhaust gases.

The Hagerstown company's chief engineer, who called the conference of airline executives to get their reactions and suggested changes, rather than presenting them with a final proposal, said the aircraft would have no trouble operating out of existing airfields. He gave the required take-off run over a 50-foot obstacle as 2610 feet and the required field for landing (again using the 50-foot barrier) as 2510 feet.

Working on Reverse Thrust

Tydon declared Fairchild is working on a reverse-thrust device based on the jet variable nozzle principal which would make the necessary landing field even shorter.

He also stated the one-stop operation on a coast-to-coast flight would not create much of a fuel consumption problem. With its gross weight of only about 76,000 pounds and the 30,000 pounds of thrust being produced by the two J67 engines, the M-186B would not have to lumber up to its optimum altitude (using great quantities of fuel and increasing operating costs in the process) and then immediately start setting down again.

Other points of interest about the new Fairchild jet proposal:

- Optimum operating years will be 1958-1970, i.e., before higher thrust engines which will make possible supersonic transports come into existence.

- Landing gear is composed of triple-wheels having a K-modulus (ground impact) somewhere between the Lockheed Constellation and the Douglas C-124 Globemaster.

- Crew will range between two and four persons in the cockpit.

- "Blister" windshields jutting away from the fuselage to give the crew better visibility will be used.

- APS-42 search radar will be installed in the nose section to provide greater safety protection.

- Fairchild directors have authorized the expenditure of about \$1.5 million on the project so far and more authorizations are expected.

- Next step on the aircraft is a series of high and low-speed wind-tunnel tests on a scale model but construction of a prototype has not yet been approved.

Production model of North American's F-100 may try to take the speed record from Douglas' F4D, which currently holds it on a three-kilometer course, according to reports from the Salton Sea. The YF-100 now holds the record on a 15-kilometer course, having set the mark at 754.98 mph.

Emphasis on the probe-and-drogue flight refueling system (as distinguished from the flying boom technique) is expected to bring a sizable quantity of new business to Flight Refueling, Inc., only U. S. manufacturer of such equipment. Reports have put the total of new USAF orders to the firm as high as \$13 million.

New State Department representative on the Air Coordinating Committee will be Samuel C. Waugh, assistant secretary of state for economic affairs. Paul Barringer, director of the Office of Transport and Communications Policy, has been representative of the Department.

Reservation, ticket sales, and baggage will be handled for New York Airways by United Air Lines, according to the terms of a recent agreement. The helicopter firm's advertising will also be given counter space by UAL.

A West Coast Air Safety Seminar and annual award dinner has been scheduled by the Flight Safety Foundation for December 14 and 15 at Norton AFB and Arrowhead Springs Hotel, San Bernardino, Calif.

The USAF has demanded the return of leased C-54's from commercial operators who failed to sign new leases. New monthly rental is set at \$12,300 per plane. Only 16 of the C-54's currently being leased from the AF have been re-leased at the new rate.

Negotiations appear likely in order to enable U. S. Airlines to regain six C-46's which it formerly operated on lease from the USAF. The airplanes have been in "storage" since a bankruptcy ruling in September. U. S. now has new management.

Douglas DC-7 certification flight testing is nearing conclusion, with accelerated service test now in progress.

Smithsonian Institution has been presented with the converted F-51 Mustang in which Capt. Charles F. Blair flew non-stop from Norway to Alaska over the North Pole. Blair is a Pan American pilot.

Jet testing equipment at Pratt & Whitney's Andrew Willgoos Turbine Laboratory near Hartford, Conn., has been augmented by a 50-ton metal altitude chamber. Device will test turbojet and ramjet engines.

Jet fighter emergency escape systems were given attention during the Air Training Command Flight Safety Conference at Norton AFB, Calif. Greater standardization was called for.

Air Force public relations is due to get an assist from a new arrangement whereby each of the AF's deputy chiefs of staff in the Pentagon will have a public relations officer assigned to him. The officers will work through the office of Maj. Gen. Sory Smith, AF public relations director.

"Jet cooling" and muffling patents have been purchased by the Fletcher Aviation Corp. from Prof. Otto C. Koppen of the Massachusetts Institute of Technology. New mufflers based on the patents are now in production by Fletcher for use in Continental-powered Navions.

Stand-by engine generators on "several hundred omni and low-frequency radio range stations" will be shut down by the CAA. According to the AOPA the program for doing so has a December 31 deadline. The CAA states that industry comment will be solicited before definite action is taken.

The practicality of obtaining new and faster all-cargo equipment is being investigated for Riddle Airlines by vice president Philip A. Mann. Mann plans to visit Douglas and Lockheed.

Cycle maintenance of USAF B-47's will be handled by Boeing Aircraft plant at Wichita, in accordance with a contract received from the Air Materiel Command. Work will begin next June and last for 18 months. Similar contracts for B-36's are held by Convair-Ft. Worth.

Interview

With

Bartram Kelley Chief Engineer Helicopter Division Bell Aircraft Corp.

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Design Trends in Helicopters

• • •

Bartram Kelley, 44, chief engineer of Bell Aircraft's helicopter division in Fort Worth, has been working with rotary wing aircraft developments for the past 24 years. Kelley was partially responsible for launching the first commercially certificated helicopter, the Bell Model 47, back in 1941. Since that time more than 1000 Bell helicopters have been produced and have logged more than one million flight hours.

A native of Rosemont, Pa., Kelley received his M.A. degree from Harvard in 1934. At one time he served as a mathematics instructor at Choate School in Connecticut, and at the Phillips Academy in Andover, Mass.

He is a member of the Society of Automotive Engineers, Institute of the Aeronautical Sciences, the National Advisory Committee for Aeronautics, and the American Helicopter Society. He served as president of the latter organization during 1951, prior to which he had been general chairman of the annual forum. While president of the AHS he attended the Congres Internationale de Giraviation held in Paris, and has since made other investigative tours abroad.

Q. How many types of helicopters has your company produced up to date and what has been the total number produced?

A. There have been five basic types totaling close to 1500 machines.

Q. Approximately how many go abroad, including military and commercial?

A. There are now approximately 162 ships operating in foreign countries. This figure is exclusive of U. S. armed forces ships of which no records are available.

Q. When do you expect to start offering the military XHSL as a commercial helicopter?

A. We have a large military order. We have not set ourselves any date on the commercial version yet, although, of course, we can't help having our eye on it.

Q. Is 25 passengers a pretty good figure for that helicopter?

A. I would say between 20 and 25, depending on the range desired and the equipment. The capacity of the helicopter now is quite limited because of its specialized use. Of course, once the rotor system and associated mechanical parts are developed, it is simply a matter of lengthening the fuselage.

Q. Actually the size of the XHSL is determined primarily by its sub-hunting job rather than by cubic requirements?

A. That is correct. This particular machine is designed to be as compact as possible. We could lengthen it 5 feet and widen it correspondingly.

Q. And that's the version you think would take 25 if you stretched it that much?

A. I would say that based on the lift and present airline standards of reserve power, twin-engine considerations, etc., I would still estimate 20-25 people.

Q. How do you justify a helicopter of this general size with only one powerplant?

A. That was a customer request. We originally designed it for two; they asked us to change over to one. We had both engines side by side approximately where the single one is now, using partial nacelles.

Q. Do you think all the future helicopters in that size category will be twin engine?

A. That's a very difficult question. I personally am not so enthusiastic about twin engines as a lot of people in industry and in government are. I feel that the twin-engine aircraft was almost the complete answer, let's say 95% of the answer, to the airplane problem in the same stage of development. It also was very little if any hardship on the airplane to incorporate twin-engine design.

The helicopter case is different. It is more of a hardship on the performance in the helicopter to go to two engines and the safety gain from it is not so great. Instead of solving 95% of the problem, I would say that perhaps something in the order of 40-60% might be solved by multiple engines.

I think the helicopter problems are not as serious as they were and are in the case of the airplane. For instance, I do not know personally of a single fatality in a helicopter due to engine failure. I also do not know of any fatality due to getting lost in weather in the case of a helicopter.

Q. There has been virtually no weather operation though, has there?

A. I think there has been a lot more informally than most people realize, especially in mountain terrain in the West.

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'We are going ahead with the Turbomeca Artouste'

Q. What are your engine difficulties as such?

A. There have been a great many engine failures in the course of getting helicopters launched. I don't know whether there are any more or any less than the airplane suffered at the same stage. But in any reasonable terrain, by daylight especially, there is less physical danger of death or injury comparable to the case of the airplane.

Q. What are currently the main causes of fatal accidents with helicopters?

A. Partly structural failures and partly pilot error. The machine is so tremendously versatile that people push it to its limit, as I suppose they will any machine.

Between the novelty of it and the fact that it would do so much there were quite a few accidents originally due to pilot error. Now there are many fewer, but they still go on in the form of flying into wires, for example.

Q. Where would you say that a predominance of the structural failures occur?

A. At Bell we have never had anybody lose a life due to a failure of a main rotor. However, we have had serious accidents due to failures of tail rotor, tail rotor drive, engine mount.

Q. Why is the loss of the tail rotor so critical?

A. It isn't always; we have had tail rotor failures with no injury. But in some cases if the tail rotor breaks off and the tail rotor gear box also comes off, there is enough center of gravity change so that there is a very violent maneuver. The pilot instinctively moves the stick very hard, and the main rotor starts to hit the tail boom.

Q. It is sort of a by-product, then; there is no real reason why the loss of a tail rotor should be fatal?

A. There is no particular reason, that is perfectly true. We had tail rotor failures in the early experimental days and tail rotor drive failures with no injuries. It happened to me twice in 1947—actually hovering very close to the ground and there was no problem.

Q. Is there any plan to put geared turbine engines in the Navy helicopter, the XHSL?

A. I am glad you mentioned geared turbines. There is no such plan at the moment. I might qualify what I said about two engines to include the fact that the gas turbine is a pretty good solution in that the empty weight of the engine is light. The penalty resulting when you operate on one engine and carry the dead weight of the other is not so great in the case of gas-turbine-powered helicopters.

Q. Do you feel that there is enough merit in the turbine engine to justify doing away with the piston engine in most of your helicopter applications?

A. I think it is much too early to say "justify doing away with" piston engines, but of all the alternatives to the piston engine, we consider the geared turbine drive the most promising, and we are going ahead with it.

Q. Which engine are you interested in?

A. We show active interest in all the new designs now proposed, but the one we are actually going ahead with (because we can get it) is the Turbomeca Artouste—in our Model 47.

Q. Are the engines being supplied by Turbomeca or by Continental, the U.S. licensee?

A. Through Continental.

Q. How big do you suppose a rotor can get mechanically before there will be trouble because of the diameter?

A. We have designed a 60-foot rotor. The largest one we have flown is 51½ feet in diameter, and I think that perhaps something in the order of 100 feet will be possible. The Hughes machine, which was jet-driven, had one 130 feet in diameter. I think that is perfectly possible in a rotor which you are not driving by shaft torque.

Q. Do you get blade bending problems when the rotors get this large?

A. Yes, there will be some problems similar to the problems of large airplane wings, and they will be solved about the same way.

Q. What is the general relationship of rotor blade chord to span—the equivalent of wing aspect ratio?

A. We use the word solidity for that, which is the ratio of the area of the blades to the area of the circle covered. Current solidities are even as low as 0.025 or so up to practically 0.100.

Changes in Solidity

Q. How much of a change can you foresee?

A. In general we have a very powerful tool in the choice of solidity, the width of the blades. For example, it is possible to make a machine lift quite a bit more at sea level, if you know it is only going to be used at sea level, by giving it low solidity, thus causing the blades to be near the stall angle. Then the ceiling will be very low. Or vice versa. For high tip speed and high forward speed the solidity is low. We find this can be most easily obtained by keeping the number of blades to a minimum.

Q. Do you see any problem in translating a small vehicle, such as Bell's developmental convertiplane, into a big one?

A. No, I don't see any different problem from the one encountered in helicopters or airplanes. I would like to point out that as a company we are the only one I know of that has built single-rotor machines and tandem-rotor machines using both seesaw rotors and hinged rotors. We have three-bladed hinged rotors on the convertiplane and seesaw rotors on all our other helicopters.

Q. What is the reason for going to a different rotor in the convertiplane?

A. Actually any rotor which we put on the convertiplane must be radically different from the ordinary helicopter rotor because it must operate in the two different regimes—higher rpm for hovering and lower rpm in the forward cruise condition.

The seesaw rotor would have had to have many modifications to cover that. Also the three-bladed hinged rotor that is on there is pretty well modified compared to the ordinary helicopter rotor.

Q. What about the various types of jet engines?

A. Well, we have studied the whole question of jet helicopters—ramjet, pulse-jet, and pressure-jet—as all the companies have. We have also followed very closely what some of the other companies are doing here and abroad.

I look on the jet-driven rotor, especially in small sizes, somewhat as I look on the electric automobile: it is a won-

'Jet-propelled helicopter . . . for a special use'

derful solution for certain problems. It has the world's simplest powerplant, which is a battery; it has no transmission; very simple control levers, perhaps only one (Grandma can drive it); and no maintenance. In fact, only one thing is wrong with it, obviously, and that is range.

You keep hearing people say in the case of the jet helicopter, "Well, we are working on that and making progress." I don't doubt but what the electric automobile people before 1925—or whenever it died—were saying, "Well, any day now we will have a battery that will give us longer range."

However the electric automobile never did really completely die. It is confined to short range application. There are vehicles powered by electricity all over the country. So I see nothing wrong with the idea of a short range jet-propelled helicopter, provided it's for a special use.

Q. Does that take in the whole class of ramjets, pulse-jets, and the whole family of them?

A. Yes, I believe it does, to different degrees. They have different cross-over points. Perhaps the ramjet shows more lifting ability under 20 minutes or half an hour, and the pulse-jets somewhat better. It's hard to make a dogmatic statement because, as I said, I don't think they are going to die out completely. In the larger sizes they solve some of the structural problems.

Q. Wasn't Bell working on a pulse-jet?

A. We have done fairly crude research, both on paper and in the form of test work, with ramjets, not with pulse-jets. We have also tried designs mounting turboprops, engine and all, on the rotor tips of very large helicopters. This is at least a remote possibility.

Q. What is the relative fuel consumption of a ramjet compared with a straight jet, a geared turbine, or a piston engine?

A. I would rather give it to you in terms of cross-over points. I would say for endurance of 20 minutes to a half hour or less, the ramjet would be the best powerplant. But its fuel consumption is so high for flights longer than that it carries too much fuel in order to stay aloft and loses payload compared to piston engines. The pulse-jet is somewhat better and the pressure jet still better. The geared turbine almost equals the present piston engine—three or four hours.

Q. How about noise? Doesn't the geared turbine have definite advantages in noise over the reciprocating engine?

A. Yes, it certainly does. The Kaman project more or less proved that.

Q. Why accept the geared turbine engine in place of the piston engine? The fuel consumption is still going to run 25% or so more.

A. Because of the lighter weight for two-engine installations and the possible noise reduction it would effect.

Q. I believe you mentioned earlier something to the effect that jet-driven powerplants might be useful in eliminating some of the structural difficulties now presented. Is that correct?

A. Well I merely meant to imply that if you build a larger and larger rotor it is technically easier to have it pulled around by the tip instead of twisting it around by shaft torque. The jet lends itself to that.

Q. There have been proposals that small Aerojet JATO bottles be mounted on rotor tips to provide an emergency

power supply in the event of an engine failure on a single-engine helicopter. Do you feel that's practical?

A. Not at the present state of the art. I think that point might be reached, but we have other problems far more pressing at the moment. There is research going on in relation to that problem and it is a good thing that it is being done, but I wouldn't rate it very high in urgency.

Q. What do you consider your urgent problems today on helicopters?

A. I think the most urgent problem is to get the price down and the maintenance simplified.

Q. Have you any definite signs of reduction in prices?

A. Well they haven't been going up as fast as the cost of living.

It is hard to stop the upward trend as long as we are improving them at the current rate. You have to remember that a few years ago it was a miracle that helicopters flew at all. They were in great need of improvement, but because they flew at all they were salable articles.

We haven't stopped improving them. I think the rate of improvement is much greater than it has been in commercial airplanes. We have held the price about even and still managed to keep some improvement steadily going on.

Unofficial Week-ending

Q. Do you think there is hope for a personal helicopter to the degree that people have light airplanes?

A. I certainly think so. I think there are a great many more personal helicopters now in use than a lot of people realize. A good many of the operators who own more than three or four ships today often use one for personal reasons. Unofficially, I suspect there is a great deal of week-ending in helicopters.

Q. What do you see as the speed and range of the helicopters in service 10 years from now?

A. I see a helicopter "DC-3" at 150 mph with somewhat less range than a DC-3, in fact considerably less range. I mean a practical helicopter.

Q. Comparable seat-mile costs?

A. That's not in my province, but I would say higher seat-mile costs and justifiably higher. Comparable seat-hour costs; but you are flying slower than the DC-3's and into places inaccessible to DC-3's.

Q. What improvements have been made in the Bell 47 since it first went into production?

A. The biggest single improvement, and the most recent, is the opening up of the center of gravity travel to seven inches so that it's no longer necessary to shift the battery as ballast when changing from one pilot alone to full cabin room for three people. The greatest number of improvements have been in correcting service complaints.

Q. Could you give us any idea on what you might have done in reducing rotor or gear problems through developments?

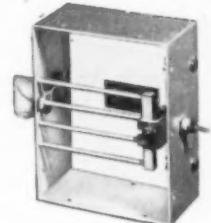
A. We have gone from an original 165 hp engine to 200 hp and in the process of transition lost weight, mainly by going to 100% ground gears. We now have 600-hour overhaul periods on the transmission which represents a great improvement. We have switched to metal tail rotor blades. The main changes, however, are in the direction of simpler maintenance, longer life parts, and opening up the center of gravity travel.

We think that the answer to the small production which the helicopter has is to keep the model about the same

MN-97B—The Bendix Omni-Mag gives immediate visual indication of glide slope information, as well as VOR, locator, and magnetic heading information.



MN-92A—This is the glide slope antenna. It can be mounted flush with the skin of the aircraft. Eliminates drag. Deterioration due to weathering, a common deficiency of external antennas, completely eliminated.



MN-81—Concentric knob-type channel selector. Calibrated directly in frequency. The same selector used for VOR equipment controls the Glide Slope Receiver.



MN-100A—The Bendix Glide Slope Receiver can be located in any convenient place in the aircraft. Requires no adjustment in flight other than channel selection by the pilot.

New Bendix Glide Slope System

FOR COMMERCIAL AND EXECUTIVE AIRCRAFT

The Bendix Glide Slope Receiver system features a 20-channel receiver (the MN-100A). This is integrated with the Bendix Omni-mag. (MN-97B) . . . with the flush mounted antenna (the MN-92A) and with the famous Bendix Da-Nite channel selector (MN-81).

Excellent Stability

Resonant frequency stability insures reliable, stable signals under all kinds of operating conditions.

The system's high degree of "on course" stability and "course width" stability is characteristic of this fine Receiver.

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high sensitivity . . . substantially more sensitive than other receivers.

It's so reliable too. Day in and day out its course indications are true under varying changes of temperatures, voltage and signal field strength.

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and make minor improvements in it every year. We can't afford to do what an automobile company does—just throw all the tooling out and come out with a brand new model.

Q. You mentioned parts life; what is the present life of a rotor on a 47?

A. We have no set life; some of the blades are still running after 4000 hours. There isn't any official life. And we think it is indefinite. It is a matter of wear.

Q. Have you given much thought to using bonded steel rotor blades?

A. We have designed several different bonded all-metal blades and are now producing all-metal bonded tail rotor blades.

Q. Is there much promise of cutting down rotor cost through this method, or is there only an improved product?

A. Again, it is a matter of numbers. In the case of the tail rotor there is no doubt about its improving the product because of wear when landing in tall grass. The wooden main rotor blade, however, has worked out so well that the improvement to be gained is somewhat questionable.

Q. Does Bell favor compounding the helicopter; retracting gear, using stub wings for partial unloading, etc.?

A. Not in the immediate future. But for any long range applications reduction in drag certainly pays off. One year the talk will be about high speed helicopters and necessity for increasing the range. The next year all the customers, and especially the military, will say they don't care if it just flies about 70 or 80 miles an hour.

Pretty soon a new regime comes in and everyone is in favor of high speed again. It is perfectly true that the helicopter is extremely dirty right now, and considerably higher speeds could be reached at some sacrifice in hovering payload.

All-Weather Operation

Q. Do you feel that there are some specific areas of improvement in the helicopter to permit all-weather operations?

A. I certainly think improvement is possible and I think we are doing it. I think the main thing is to be able to fly at cruising speeds without an autopilot, blind. Of course, it has been done quite a lot but it still is more of a stunt than a normal operation.

Q. What is needed in order to permit that?

A. I would say better stability and handling characteristics. You find a lot of work going on right now along those lines, especially at the NACA.

Q. Do you find NACA has been doing a good job in providing you with basic research data on helicopters?

A. I think the people—the group which is now on helicopters at the NACA—are doing a top notch job. I think that the NACA as a whole could put a lot more emphasis on the helicopter. I don't honestly believe that they believe in helicopters.

Q. What about intermeshing gears as specialized in by Kaman?

A. I think the intermeshing rotor configuration is a very interesting one and has a lot of promise. I don't think this whole question of rotor configurations is as simple as the old argument about biplanes and monoplanes. It's a lot more complicated and there are a lot more outstanding advantages for various configurations.

Q. There has been some tendency to question the growth potential of rigid blade rotor design.

A. This rotor design, in varying degrees, covers Bell, Doman, and Kaman, although the Kaman has drag hinges; it isn't rigid in the sense that we are. Among others are Hiller, McDonnell, Gyrodyne, American Helicopters, Hughes and Cessna. The Doman is semi-rigid and relies on having just the desired stiffness in the blade root.

We are rigid and definitely hold the chordwise frequency in the rotor as high as we can. All I can say is that we are up to 51½ feet in diameter and very happy with what we've got.

Q. What is the relationship between gross weight and the payload, or the gross weight and empty weight on current helicopter designs and what is the trend?

A. On the model 47, as a percentage of useful load to gross weight, just a little under 40%, which I think you will find is very high compared, for example, to an airline transport. A commercial version of our big tandem machine would probably have a useful load to gross weight ratio in the order of 33 or 34%, the reason for the difference being the higher speed, higher disc loading, and the greater compactness in the larger machine.

Q. Do you feel that you can go to a much higher disc loading? What's the trend now?

A. We are up to five now, and we find nothing basically wrong with going to higher disc loading. The rate of descent in auto-rotation becomes perhaps the controlling factor.

Q. What does Bell feel about the requirement for high speed helicopters?

A. We think that the model 47 and also other commercial helicopters are too slow, slightly. If the helicopter cruises around 50 to 70 knots for best range you are going to find head winds every now and then of at least 20 or 30 knots. And there the head wind is a very large percentage of your forward speed. It is going to make a big difference whether you can complete a mission. Now if you get up into the 100-knot, or even 90-knot cruise condition, you are rapidly walking away from the average head wind difficulties. Then I see very little point in going from there to 150.

In other words, I think by going from 70 to 100 we lick 80-90% of the problem. There is very little point in going up in speed, in my opinion.

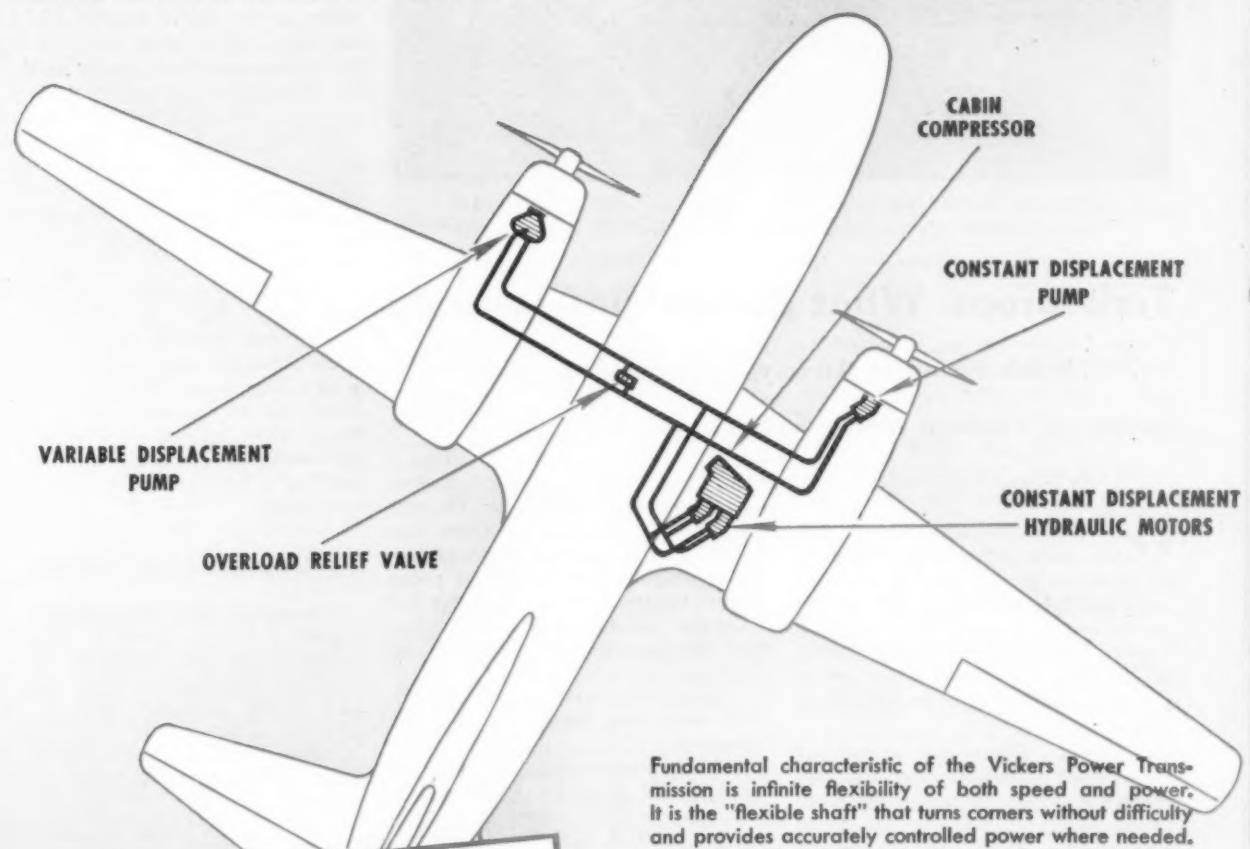
We think that actually commercial helicopters of today, our own and our competitors', are somewhat too slow, but we do not believe in going to the other extreme. For missions requiring a higher speed the convertiplane is the answer.

Q. How about growing heliports? NACA, in their prediction of looking ahead a number of years, said that helicopters would need larger landing space than they do today because they are going to require landing and take-off runs.

A. It might be true of single engine operation. But with two engine helicopters, in case of an emergency they could fly to some small airport or field other than a heliport. The thing that people forget about heliports is that although the heliport itself may be quite small, maybe a roof top, the surrounding terrain is of the considerable importance. Even with present day helicopters, it is a great advantage to be able to come in at a fairly shallow glide angle although the actual spot where you land may be small.

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6448

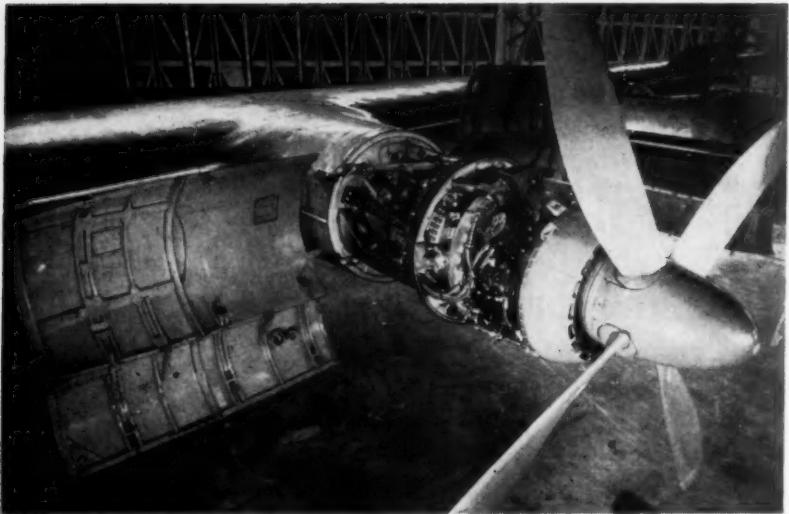
Fundamental characteristic of the Vickers Power Transmission is infinite flexibility of both speed and power. It is the "flexible shaft" that turns corners without difficulty and provides accurately controlled power where needed.

An example of the advantages of this flexibility is the drive components for the cabin compressor on Model 240 CONVAIR-LINERS. There are numerous other applications where it is desirable to transmit power to a point remote from the power source and provide selective variable speed or constant speed. These applications are easy with Vickers Transmissions.

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COWLING DOORS on the Vickers Viscount are attached to nacelles. The Rolls-Royce Dart and its mounting slide forward for quick removal.

Turboprops: What Europe Has Learned

British European Airways experience during first six months of Viscount service adds to available data.

By JAMES HAY STEVENS

ON APRIL 18 last, British European Airways began the turboprop era of air transport by putting the Dart-engined Vickers Viscount into service on its longest route, from London to Cyprus. In six months, steady delivery of Viscounts has made it possible to put them on most of the money-making routes.

Although Britain has pinned her faith on the turboprop airliner for the immediate future—a faith emphasized by Sir Miles Thomas, who has hinted strongly that BOAC will be relying mainly upon the Britannia for the next 10 years—details of operating experience are hard to obtain.

Bristol has many hundreds of hours of bench running and flight experience with the Theseus and the Proteus II, but the flying has almost all been done on Lincoln test beds. The prototype Britannia had, by September 15, completed 175 hours flying: 118 hours 25 minutes with the 605 (Mark II) engines, and 56 hours 35 minutes with the operational 705 (Mark III).

Armstrong Siddeley has built up over 40,000 hours experience with the Mamba and the Python, nearly 10,000 of which have been in the air under government contract for defense purposes. The results are classified.

It is important to realize the back-

ground of turboprop operation. Experience when BEA ordered the Viscount was almost nil. Not only were the hundreds of thousands of hours of general knowledge that lie behind piston engines entirely lacking, there was not even the backing of military experience that supported the Ghosts of the Comet.

BEA had to make its own experience, which was done by a two-phase simulation.

* **First phase** was a "typical flight" schedule laid down for Rolls-Royce to bench-test the Darts. Based on an average of the BEA network, the engines were run under a taxi, take-off, climb, cruise, let-down, land and taxi sequence, into which typical variables, such as temperature, moisture and dust, were fed.

* **Second phase** was the operating of two converted DC-3's on scheduled freight services. Here there were four-fold advantages: air crew experience, servicing experience, traffic-pattern experience, and the increase of overhaul life to at least 375 hours.

Between June 9, 1951, and April 16, 1953, BEA obtained 3454 engine hours with the Dart DC-3, to which could be added 2812 engine hours on the first Viscounts during crew training and route proving. This came to a total of 6266 engine hours—not a large background for starting operations into the peak summer period.

Overhaul period in April was, thanks to the DC-3 experience, 400 hours. Today it is 500 hours, and 12 engines are now being run to 600 hours to get clearance for this figure, which fits into the airframe check pattern of 85, 150, 300, 600, 1200 hours. This overhaul life of 500 hours is clear cut: there is no intermediate internal inspection of any kind, as is usual on most turbine engines.

A feature much appreciated by maintenance and operating staff alike is that nearly all the Darts are achieving their full life. As of October 20, only one engine had failed en route—and the airplane was flown empty on three.

Effect on flying control of Viscount cruising at around 25,000 feet, with rapid climb, let-down at 1000 feet per minute, and holding patterns at 18,000 feet is negligible. In any case, on its comparatively short stage lengths BEA can usually manage ample reserves for stacking.

Pilots have experienced no difficulty with engine handling; in fact, it is simpler than a piston engine: starting is by automatic relay; control in flight is by a single lever. The only extra control is the fuel trimmer, a fuel-setting device which corrects the fuel/air ratio for variations in ambient air temperature on a jet-pipe temperature versus rpm datum.

Water-Methanol Injection

Automatic water-methanol injection is used as a power restorer. The Dart is designed to give full take-off power at ICAN standard, i.e. 59°F, and for each degree above that there is a fall of 2/3% in power. The water-methanol is metered into the fuel to restore full power up to 113°F—it is not a power booster.

This system comes on only when the throttle levers are fully forward and it is regulated from the torque-pressure relays. It has been found perfectly satisfactory on all BEA schedules.

BEA engineers are outspoken in praise of the turboprops. It is necessary, however, to develop a new approach to engine maintenance. Installed, the Dart requires practically no servicing, other than visual inspection for leaks, tightness, damage, and the cleaning of filters.

Powerplant removal is simple, taking about one hour off, one and a half hours on, with two men to locate the unit as it is maneuvered into place. The powerplant can be changed with the propeller attached, but it is then somewhat clumsy, so propeller removal and refitting usually adds another 40 minutes.

If the interconnected fuel, c.s.u. and water-methanol controls have to be re-rigged, an additional $1\frac{1}{4}$ hours is required. Overall best time, from cowlings open to cowlings closed, is about five hours.

Importance of this figure can be realised from the fact that the Darts are at present being run to full life, meaning sometimes two engine changes during an 85-hour Check I. The 85-hour Check I was based on a route pattern and is soon to be raised to the more logical figure of 100 hours. When 600-hour life has been reached, engine changes will be on Checks II, III and IV only.

Chief Maintenance Engineer Ivor Gregory emphasizes the new approach needed with the Dart. First, check work is limited almost entirely to inspection; second, control rigging is a delicate operation requiring skill, patience—and practice.

Already the Dart is showing a good serviceability record: in August nine Viscounts flew 1076 hours, with an average of 2.5 hours flight per landing, and a serviceability of 66% on the maximum hours available.

It appears that propeller ground fine pitch (disking) aids pull-up and prevents excessive wear. Dunlop plate brakes are used and the defect rate is only 2.3 per 100 landings.

There is no conclusive evidence as yet of increased instrument or airframe life due to absence of vibration.

Maintenance Problems

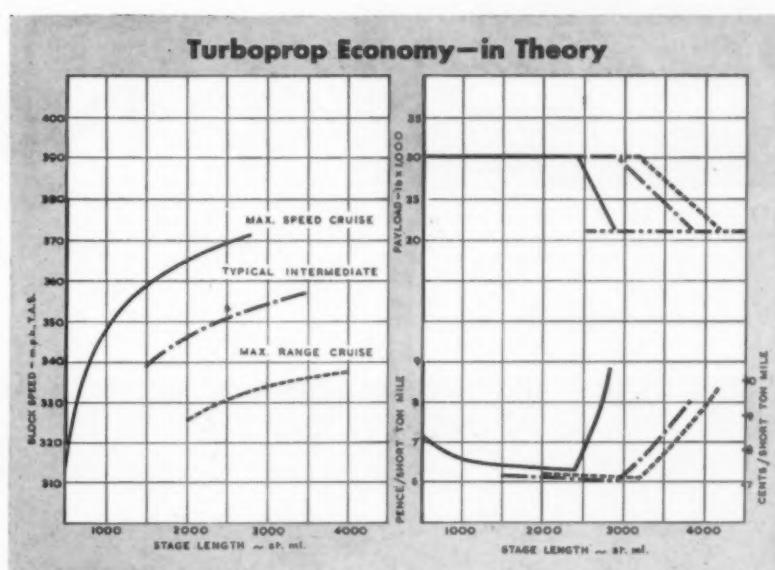
During this first six months there have, of course, been teething troubles. Because of them the actual maintenance costs were higher than expected.

- First, and most serious, was the sudden appearance of metal in the filters of one of the DC-3's not long before the Viscounts were scheduled for delivery. This was traced to the cages of the reduction-gear layshaft bearings. After experimenting with various metals for the cages, Rolls-Royce fitted cageless rollers instead. No failures occurred as a result of this secondary fault, but it meant that until all engines were modified the propeller and reduction-gear cover had to be removed at 150 hours for an inspection of the bearings.

- Gear box drive shafts gave some trouble until they were lubricated with graphite grease;

- Some tail-cone attachments failed and had to be beefed-up, necessitating engine removal for modification;

- During hot starts the torch-igniter plugs carbonized up, and there were some delays before sufficient spare plugs were provisioned to permit replacement without cleaning on the spot.



LOW DIRECT OPERATING COSTS and high block speeds are illustrated in these graphs of the Britannia Mark 300, computed according to ATA comparative method.

These few snags, together with the need to learn both the airplane and the engine, led to higher check costs than will be the case in the future.

Turboprop starting is still a major headache. The 24-volt system used for the Dart requires a full 28 volts if the engine is to be spun at the 6000 rpm needed for safe starting.

Slow turning means slow burning and a hot start, in which the temperature soon exceeds the permitted 1120°F. maximum—with consequent risk of flame-can distortion and igniter plug fouling. To provide for this load BEA provisioned special Murex diesel starter trucks at all airfields.

In preparation for winter operation further action has been taken. The normal turbine lubricating oil has been replaced by a new synthetic-ester base lubricant, Esso 35, which has a flat temperature/viscosity curve. The snag about this oil is that it costs about \$10 a gallon—but since a turboprop uses practically no oil, this as a small capital charge rather than a running expense.

A later step is to change the ignition system completely for a new one of high-energy type. This modification will entail fairly extensive airframe rewiring, the fitting of 26 Kv booster coils and small engine alterations; it must be remembered that ignition on a turboprop is *only* used for starting.

Reasons for the change are twofold. Apart from carbon deposits rendering the torch-igniters inoperative, gas blow-back down the flexible fuel supply line to the torch can cause damage. The high-energy spark is produced on a specially surfaced electrode which is

unaffected by carbon or liquid deposits—in fact any fouling actually increases the spark as the carbon, or other matter, is heated.

This system was used on the London-Christchurch Race airplane, where starts were made with unfailing regularity. • • •

New Bendix Building Under Construction

Bendix Aviation Corp.'s Pacific Division has started construction on the first increment of a new engineering building in North Hollywood, Calif., to house the division's airborne radar and hydraulic engineering departments.

Scheduled to be completed in February, the new facility in the initial phase will be two stories high and will provide approximately 23,000 square feet of floor space. Its highly stressed roof will be constructed to permit its use for radar antenna development and research. The entire back wall will be built so that it can be removed for later expansion. Laboratory facilities will be located on the first floor and offices on the second floor.

R. C. Fuller, general manager of the Pacific Division, said the new structure represents the fourth important plant expansion since 1948. Ratio of engineers to total numbers of employees at Bendix Pacific is now one to four, Fuller said. W. S. Leitch is chief electronics engineer and C. E. Deardorff is chief hydraulics engineer.



1923 Sperry high intensity arc revolving beacons and high intensity arc airport floodlights, installed at regular intervals, guided the first Air Mail night flights between Chicago and Salt Lake City. As night flying expanded, Sperry supplied 24-inch incandescent revolving beacons to light the airways.

GIVING PILOTS "S"



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S "SECOND SIGHT"...

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With the development of powerful searchlights to light the airways 30 years ago, night flying became possible. Thus Sperry began giving pilots "second sight"—a project that has never ended. Among the major achievements are the Gyro-Horizon, giving the pilot an accurate artificial horizon when the natural horizon is blotted out by fog or darkness . . . the Directional Gyro, assuring a straight course, unaffected by magnetic disturbances that set magnetic compasses spinning . . . the Automatic Approach Control, that guides the aircraft along a precise path to the runway in response to signals from the instrument landing system.

Military, commercial and private planes depend on these and other precision Sperry equipment, either produced in Sperry's own plants—or by companies licensed to use Sperry patents.

TODAY, AS THEN, SPERRY LEADS THE WAY

Working with the Government's Military/Civil Air Navigation Development Board and the U. S. Weather Bureau, Sperry engineers are now tackling one of the last remaining obstacles to routine instrument approaches under all-weather conditions—the lack of continuous accurate information for the pilot regarding *actual* weather conditions existing in the final approach area. When this problem is solved—as it will be—Sperry will again have contributed significantly in giving pilots "second sight."



1929 Lieutenant "Jimmy" Doolittle, in hooded cockpit of Consolidated NY-2 made first complete "blind" flight over Mitchel Field, Long Island. Using Sperry Gyro-Horizon and Directional Gyro, Doolittle took off, flew over 15 miles and landed "blind."



1937 Captain Carl J. Crane, Captain George V. Holloman and Raymond K. Stout, flying an Air Corps Fokker YIC-14, made first completely automatic landing using Sperry Automatic Pilot and radio guidance.



1941-45 Sperry radar enabled Navy pilots to seek out and destroy enemy aircraft in the air—and submarines at sea. The Sperry-developed Klystron tube made such radar possible.



1953 Sperry engineers at their MacArthur Field Flight Research Base amass data on hundreds of "limited visibility" landings during the current weather research project.



Tomorrow, Sperry-developed radar, above, will be employed in storm warning, terrain clearance, collision prevention, and in navigating on radar beacons—insuring even safer flight and giving the pilot the ultimate in "second sight."

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The Firebee carries no human pilot, yet this remote-controlled target plane has phenomenal performance like a modern fighter. It is launched either from the ground or from a "mother" plane and is recoverable by a highly efficient parachute system that lowers it gently to the ground.

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The Army and Air Transport

WRAPPED in a Pentagonian blanket of silence is the subject of how American troops are to be transported overseas in the event of another world war. Are they to go by troopship or by air transport, or a combination of both? Nobody in the Pentagon can say, because it involves war plans and troop movements, which are top secret.

However, it would seem proper for the Department of Defense to make public its general policy without in any way endangering national security. This reporter has submitted through channels four specific questions to which he is—not very hopefully—awaiting answers.

An address by Under Secretary of the Army, Earl D. Johnson, before the Air Force Association in Washington last August gives a clear picture of Army thinking. He said: "I want to tell you something about the Army's plans—the same Army which in our memories was horse-drawn and then truck-drawn. . . . The word 'mobility' describes best the key to all of our plans. We have learned that in an age of megaton weapons capable of producing megadeaths, the creation of any weapon which is gigantic, which cannot be disassembled, hidden, moved dozens, even hundreds of miles will be in jeopardy because it lacks defense in mobility and it lacks surprise in attack. This applies to forces of men as well as the weapons given these men to use. *Mobility in space and in time is the key not only to waging an actual war, but also should be an integral part of the planning for it.*"

That appears to be a clear statement of policy. But is it being implemented? There is little to indicate that it is.

For example, in the Korean War—which history may declare was the real dress rehearsal for World War III, on a limited scale—most of the troops, including the Marines, went to and came back from Korea in slow surface ships, not by air. To return by air, the soldier first had to be wounded.

Here's what the Army did last spring: It sent 1300 soldiers from Korea to New York City, with a stop at San Juan to land Puerto Rican soldiers, and another at Norfolk. The voyage required 37 days. So, those 1300 men spent 48,100 man-days travelling on a slow boat from the Orient.

Just why the Army selected a slow ship rather than fast aircraft is unknown. But a Boeing C-97A Stratofreighter—to mention only one Air Force transport—is listed officially as being capable of carrying 135 troops. For reasons of comfort, however, MATS in its operations limits the load to 80 troops. Those 1300 soldiers could have been brought from Korea to New York in 17 C-97's, in the space of two days' time, thus saving 45,500 man-days of travel time.

The Army, in spite of Mr. Johnson's statement about mobility, seems to go along with a steamship company's ads: "Half the fun is in getting there."

The Navy has stated that the improved submarines now building, together with the modernized World War II subs with snorkel tubes, are far more of a menace than those of the late big war. These modernized subs can remain under water for long periods, with no more than their snorkel tube above the surface.

In a war game in the North Sea last winter—Operation Mainbrace—the Navy learned, apparently much to its mortification, just how potent a weapon of destruction the modernized submarine may be.

In one particular force there were four actual aircraft carriers and five "simulated" carriers—smaller ships designated as carriers. Of the four actual carriers, all four theoretically took torpedo hits. That is to say, submarines successfully penetrated the screening fleet of cruisers and destroyers, and when in firing position announced that they had sent off their torpedoes. The referees registered them as hits.

Whether all four, or any carriers, would have been sent to the bottom in actual warfare is a matter that Navy evaluation boards spend months figuring out. Then they stamp the findings "Secret" so air-power advocates—such as General "Tooey" Spaatz—still don't have any official Navy answer to that nasty question, "What are the carrier's chances of survival?" Only another war will settle that one.

Manpower vs. Mobility

Referring again to Under Secretary of the Army Johnson's speech on policy, he said: "Our nation is faced with potential battlefronts which are truly global, encompassing such vast mileages that our economy can never hope to deploy sufficient forces and material to protect all of them at all times under all conceivable conditions. Our relatively limited manpower is faced with unlimited manpower. And while we preserve a good life here, producing limited weapons in limited quantities, entire nations of peoples are bent in labor to produce, store and deploy much greater quantities of weapons at the cost of national well-being and individual dignity.

"This does not imply that our position is hopeless, but simply that we can win, if forced into war, by being able to move rapidly through all dimensions of space and time. By this I mean movement on land, sea and in the air. . . . The key to our plans must be mobility—fast, dependable, ever-present capacity for mobility—land, sea and air mobility. . . . In short, we must be able to hit our enemy three times for each blow we receive. This, you will readily see, in effect

Those troopers will be around awhile . . .

increases our relatively limited manpower resources at least threefold."

That evidently is a sound, far-seeing policy. But again it is pertinent to ask, "Have we implemented that policy?" The answer, so far as air transport is concerned, is an emphatic "No." In fact, everything considered, we've just made first base.

Mr. Johnson says: "If war should come, an airlift capacity must exist which is, on the one hand, transoceanic so that we can deploy rapidly, and which, on the other hand, is capable of lightning assault. It is often said that the next war will be won or lost quickly. If this is true in any substantial degree, our preparation now and our planning for deployment will have to be reoriented." And has it been reoriented? Not yet.

The sad fact is that military air transportation is just about the last thing that the Congress or the Department of Defense, for that matter, have on their minds. In priority—and in appropriations for aircraft—the Strategic Air Command comes first, the Air Defense Command second, the Tactical Air Command third, and the Air Transport end of the business comes a lagging fourth.

Here's Mr. Johnson, for instance, stressing the importance of mobility. For an Army to be mobile, it must have a vehicle to be mobile in, or to give it mobility. The vehicle possessing the greatest measure of mobility in the shortest elapsed time is the airplane. It can fly over land or sea, ignoring the terrain, ignoring the action of enemy submarines. Combat air forces, both land and ship-based, must achieve control of the air, over both land and sea, or the transport aircraft can fly nowhere.

Transport aircraft, for instance, cannot carry enough fuel to fly to Europe or Africa or Korea and return without refueling, to mention only one item. Long in advance of any projected troop deployment to distant theaters, gasoline, oil, supplies, spare parts and maintenance crews must be on hand to service the transports for return trips. This, of course, is obvious to aviation people. It is not so obvious to the average citizen, or even to many members of Congress, or more would have been done to develop military air transport.

How much air transport have we? Well, the figures are classified, naturally, to baffle the enemy. But in general terms it may be said that MATS, with its various services, has about a thousand aircraft, of which something less than half are four-engined cargo and passenger aircraft. Tactical Air Command, which so far has not been used in overocean transportation, but only in the combat area, such as from Korea to Japan, has about 600 transports, including twin-engined Fairchild Flying Boxcars and Douglas C-124's.

In addition to these Air Force transports, there is in existence the Civil Reserve Air Fleet Plan (CRAF) under which MATS has the authority to contract for some 400 four-engined aircraft and their crews from the civil air lines, including non-scheduled airlines and the freight carriers. This is a war emergency measure which doesn't add a single airplane to the nation's fleet of transports, but merely grounds a large percentage of present airline passengers and transfers the airlift to the military.

Fourteen hundred transport aircraft don't seem remotely adequate to provide any such airlift as Mr.

Johnson says is necessary. The Capital Transit Company of Washington probably has more than that number of street cars and buses to transport passengers alone—no cargo. When Mr. Johnson says that air and other mobility will more than triple our forces, he is saying, in effect, that our 20 combat divisions of 300,000 men will become 900,000 men, because of this mobility. Well, just try to carry 900,000 men somewhere in 1400 aircraft and see how long it will take you.

An Army division consists of approximately 15,000 men, with 10,000 tons of equipment. Every effort is being made to lighten the equipment, and to do without some of it, but getting it down to the minimum for an airlift still would call for from 4500 to 5000 tons of equipment, it is said. The Air Force never has been called upon to airlift an Army division over an ocean, so no figures are available.

It seems odd—in fact, bizarre—to ponder that in this air-atomic age the Army hasn't made even one try at actually moving a division and its full equipment by air.

It is difficult to figure how many transports would be required to move a division without knowing in advance what types of transport would be available and what the mission is.

As the most numerous type is the C-54, with a troop capacity of 49, perhaps a fair average for the planes available would be 80 troops. That would mean 188 transports to carry a division. If the equipment weighs 5000 tons, it would require another 143 aircraft of the C-124 and C-97 types to transport it.

One Division: 331 Planes

To move a division from Alabama to Western Germany, then, 331 transport aircraft of various types would be required. And that is just about two thirds of the entire MATS fleet of transports. So MATS would have to give up two thirds of its scheduled and other service to airlift that one division over a period of a week or even more—for the planes first have to be called in.

Naturally MATS would at once call for the planes of the Civil Reserve Air Fleet—some 400—and what troop carriers could be spared for over ocean transport from the Tactical Air Command, at least at the start of hostilities. But as the war progressed, TAC would have its own front-line job to do, so it would become unavailable for trans-ocean service.

That leaves only some 900 available four-engined transports from the MATS and CRAF fleets to transport troops and also to carry out the scheduled transport services that MATS was performing before the emergency, and presumably would have to perform throughout the war.

If moving one division across the Atlantic would put MATS two thirds out of business, what would moving ten divisions entail? The answer is 3331 transport aircraft trips outbound, and another 3331 trips inbound. Meanwhile the divisions already transported to the battle front would have to be supplied, in part by air, thus taking away many planes from troop transport. It seems evident that for some years to come the Army must rely upon the trooper to move the greater part of its troops.

. . . CY CALDWELL.



Under guard on Okinawa, the MiG-15 which was delivered to U.N. forces by a North Korean pilot is reassembled.

**The Air Force pays
\$100,000 and takes a . . .**

Good Look at a MiG-15



During a week of flight tests the MiG-15, in USAF markings, was flown by five test pilots, who pronounced it inferior to the AF's North American F-86.



Three cannon constitute the captured MiG's armament. Photo shows how elevator-type gun platform holds two 23-mm cannon and one 37-mm. Platform is raised and lowered by cables.



Last-minute ground check is given the MiG before test flights begin. The group of pilots testing the plane was headed by the commander of Wright Air Development Center, Maj. Gen. Albert Boyd.

Local Lines Shaken by CAB Comments

By WILLIAM V. HENZEY

THE LOCAL SERVICE AIRLINES shaken by ominous rublings of what an economy-minded Congress may do to their subsidy bill next year, felt more significant cause for alarm in recent weeks when their future was painted as "very dark" and "disappointing," respectively, by men who were hitherto their staunchest CAB supporters—Members Joseph P. Adams and Josh Lee.

Lee, in a formal dissent in a recent rate case, viewed local service airline petitions for higher mail pay in the past six months as "a turn from a favorable trend" which "has been disappointing."

More emphatic, however, was the plea by Adams in a major policy address given to state aviation officials at their annual convention in Edgewater Park, Miss., on November 9.

Indicating, in effect, that the Federal Government has gone as far as it can in support of the local industry with its "very dark financial picture," Adams turned to the state officials as "the most important single individuals in the U.S. to the continuation of local airline service."

Adams said at the outset that neither the CAB nor he as a member "intend in any way to deny our own very clear-cut responsibility for the original local service airline experiment, nor for its continued development." But what came after that has the local carriers worrying that maybe notice had been served the old homestead was closed hereafter and the children could shift for themselves.

"I believe," he told the state officials, "you will agree with me that the Federal Government, through the CAB, has done its utmost to foster and develop local air service. While the Board is constantly alert to possible improvements of practical benefit, I am at a loss to imagine the form which prompt additional Federal support and development might take."

Adams, who wrote this speech himself, supplied his own italics.

"In light of the serious recent trends in local air service operating results despite the Federal Government's best efforts to encourage and develop these operations, the time has come for you gentlemen and all state aviation interests which you represent to actively

support our local service airlines."

Adams noted that the local lines had had phenomenal growth and fine success through 1951.

However, he continued, "since 1951, these favorable trends have unfortunately not continued. In the recent period of almost two years the favorable trends have either flattened out or actually turned into unfavorable trends.

"That the local service financial picture is very dark is indicated by the fact that from our presently operating 14 local carriers, the Board has received, within the last six months alone, six petitions for increased final mail rates, and 10 . . . for increases in mail pay.

"There are several factors which explain why these unfortunate developments have come about, but there is no single more important factor than that of passenger load per plane. After seven years of the local air service experiment, the average passenger load on each airplane operated by these carriers was only about 8½ passengers during fiscal 1953.

"This number is roughly one-half the number required by these airlines to break even without mail pay subsidy support. The passenger load for these

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AIRCRAFT MANUFACTURERS

Under new procurement policies aircraft manufacturers are faced with military requirements for ski-wheel equipment. Federal Aircraft has over 25 years of experience in this specialized field. Contact Federal for experienced engineering service in connection with correct ski design and proto-type or production requirements.

carriers has remained the same or declined slightly since 1951.

"What I want to point out to you is that this passenger load figure must go up in the future if the local service operators are to survive, and furthermore that this necessary increase in volume is a responsibility in which you gentlemen here must share."

"In all seriousness, I believe that unless the average load for these local airlines can be increased, and appreciably so, without corresponding increases in cost, the local service air carrier experiment will fail."

Adams emphasized that "just one more passenger per flight" would soften the industry's subsidy burden considerably. He urged the state officials to help generate more traffic.

Also, to help the carriers' fight against rising costs, he said "state agencies might well counsel the communities on the advisability of increasing their airport revenues by encouraging the additional boarding of passengers rather than by increasing airport charges . . .".

Thus was the picture of a top Federal official and staunch local service advocate of the past, turning to state bodies for the salvation of the local industry. Viewing this with the earlier "disappointment" of Josh Lee, the local industry, to say the least, is worried.

big corporation planes. Obviously, if non-airline civil aviation is to survive and prosper, such regulations simply cannot be concocted willy-nilly.

Despite AOPA's repeated efforts to get the near-miss and collision problem between airline and other aircraft studied exhaustively on the basis of the facts, the pro-airline people in the affected government agencies refused to do so. They insisted on proceeding with the proposed new regulation.

That left AOPA only one alternative: fight. Much as we regret having had to do so, we've had to make a public issue of that fight. We want to discontinue that public fight as quickly as possible. But we can only do so when non-airline civil aviation is no longer faced with so serious a threat.

MAX KARANT

Assistant General Manager
Aircraft Owners and Pilots Association
Washington 14, D. C.

BARNEY OF MOBILE

To the Editor:

First, I would like to say how much AMERICAN AVIATION means to us here in the Deep South. We have learned to rely on it for all of our aviation news and information. We commend you and your staff on the excellent way you tell

the aviation story to the American public.



Barney

Down in Mobile, "Charm Spot of the Deep South," we have a bit of news that we feel is worthy of recognition.

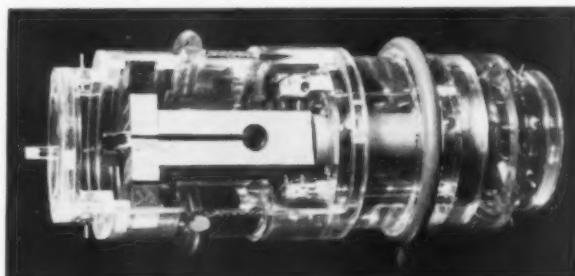
Oscar Barney, city airport manager for the past 25 years, has recently been given a banquet by 50 aviation enthusiasts in recognition of this achievement.

Oscar is 63 years old and has watched aviation grow from a cow pasture runway to the dawn of our jet age.

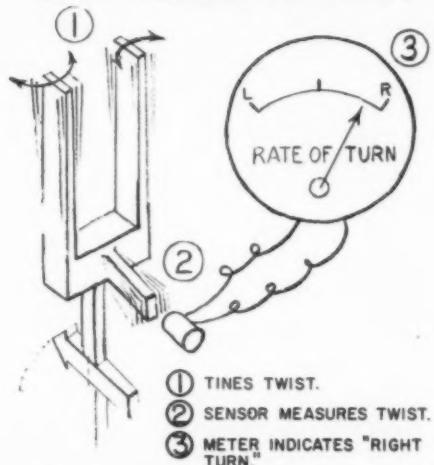
It is rather unique that Oscar is the only airport manager the city has ever had. His first duties, back in 1928, were to shoot the cows off the grass runway so the airplanes could take off. Our records indicate that he is second oldest airport manager in the United States in point of service. He is surpassed only by the manager at Tulsa, Oklahoma.

D. D. HENDRIX

District Sales Manager
Capital Airlines
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Washington 1, D. C.



NEW VIBRATORY GYRO



Sperry Gyrotron, a new type of vibration gyro, consists of a small, electrically driven tuning fork (see page 11).

NOVEMBER 23, 1953

pressure fuel servicing cap



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Currently being supplied for one of the nation's leading jet fighters, this latest Gabb Aircraft Product features

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- * Replacement of all seals without disassembly of cap
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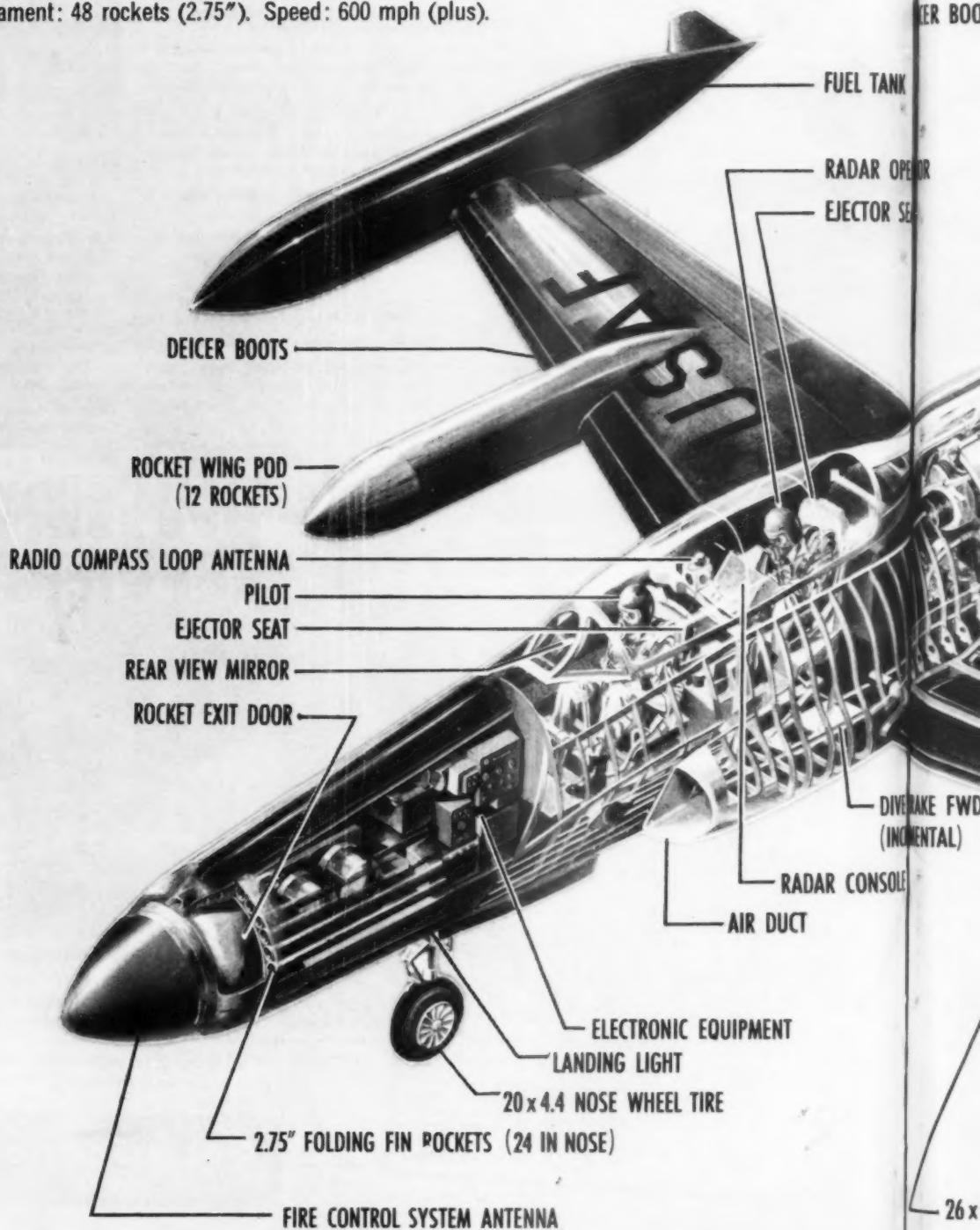
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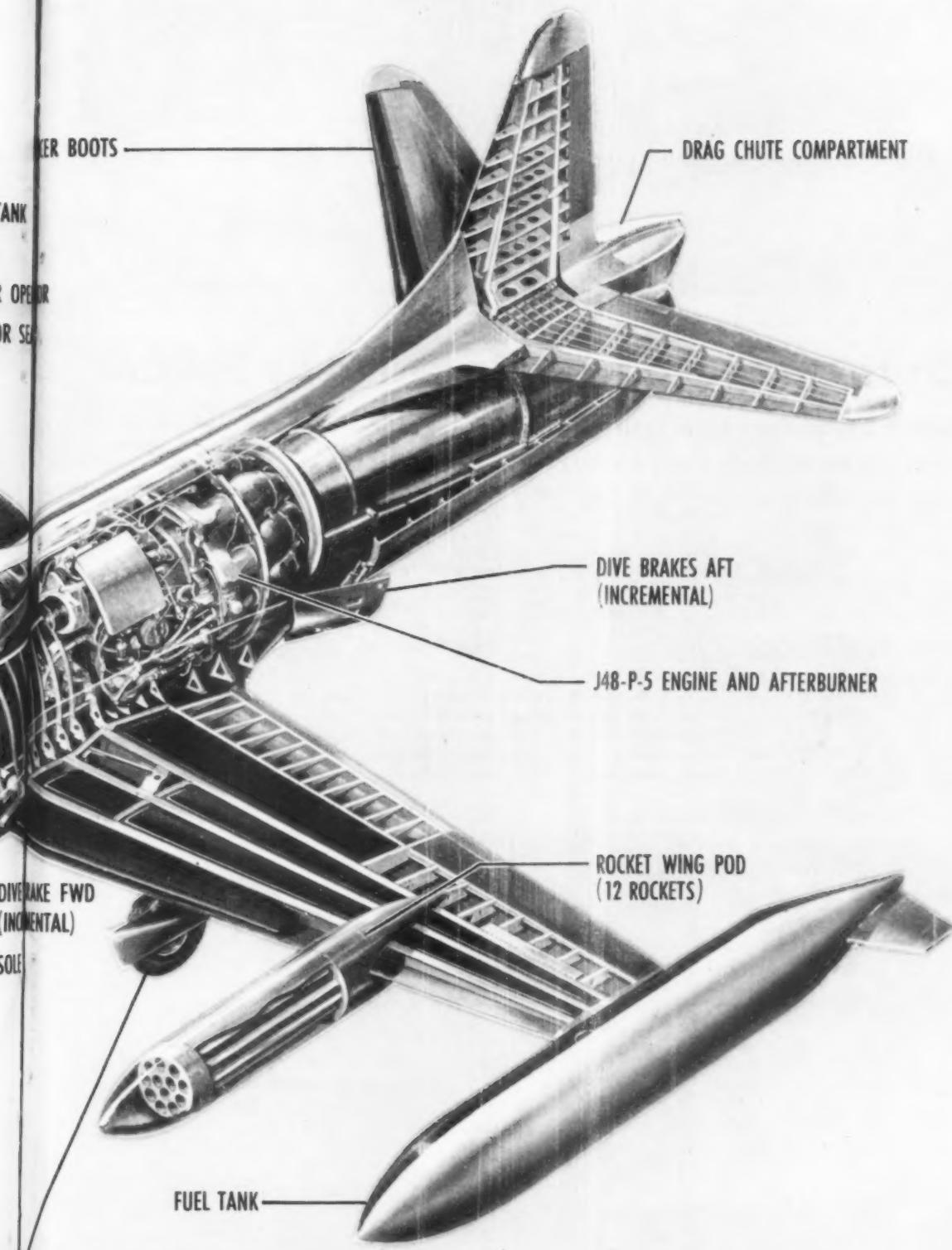
WINDSOR LOCKS, CONN.

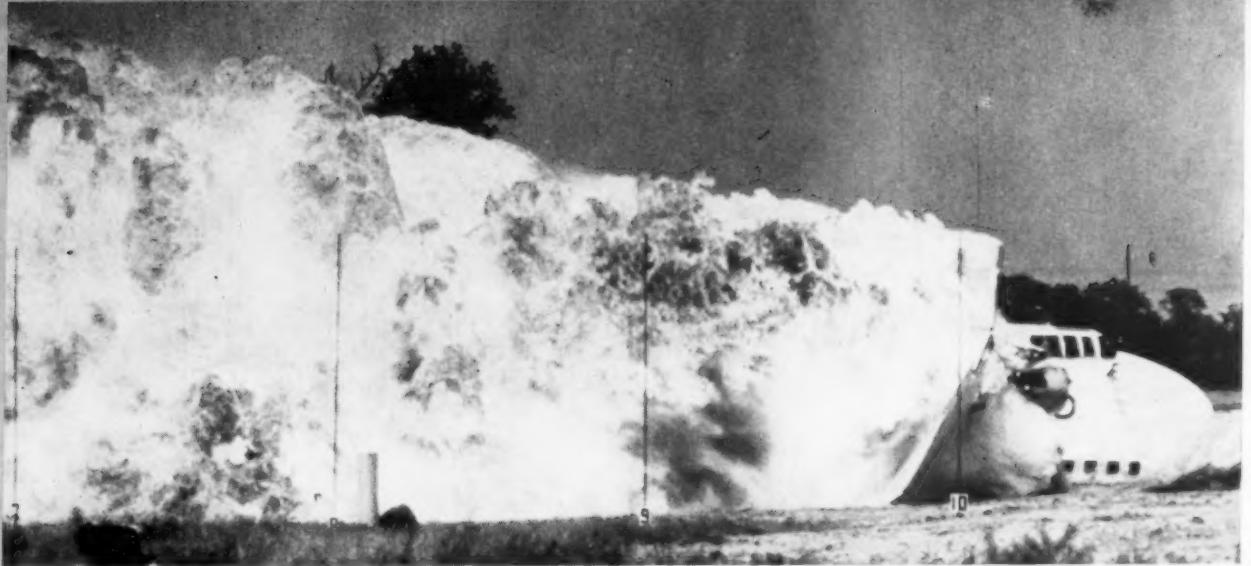
LOCKHEED'S F-94C

First cutaway view of all-weather interceptor now on 24-hour duty in air defense squadrons.

Armament: 48 rockets (2.75"). Speed: 600 mph (plus).







VIOLENCE OF CRASH FIRE that resulted from ignition of fuel mist in NACA experiment is shown above.

New Data on Crash Fires Revealed by NACA

Insulation may do more harm than good, experiments indicate; effects of smoke, toxic gases investigated.

By WALTER A. KILRAIN

(Second of two parts)

THE HOLOCAUST shown in the photo above represents graphic proof of the fact that gasoline burns most fiercely when sprayed into the air in the form of mist. More surprising, at least to proponents of the safety features of jet fuel, is the fact that low-volatility fuels burn just as readily as gasoline when they are sprayed from punctured fuel tanks during a crash.

The similar behavior of the two types of fuel was one of the discoveries

that resulted from a recent series of experiments conducted by the National Advisory Committee for Aeronautics (AMERICAN AVIATION, October 12). By crashing old C-46's and C-82's into earthen embankments and examining the results, the NACA amassed a considerable body of information on what happens during crash fires.

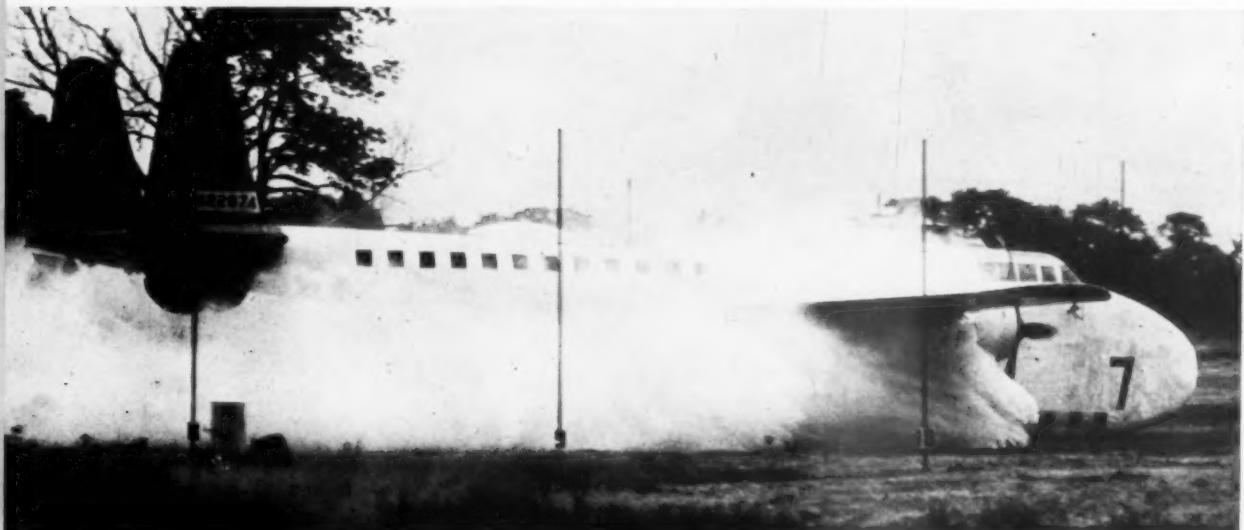
Insulation can be a mixed blessing, the tests showed. In order to determine the effect of insulation such as is used in modern transports, the NACA took two clamshell doors from cargo airplanes, one insulated with two inches

of glass wool, the other not, and set fire to quantities of fuel in front of them.

The insulation succeeded in holding down the temperature in the one case for $7\frac{1}{2}$ minutes. At this point in the test the metal skin burned away. The temperature promptly soared, rising from about 80° Fahrenheit to over 700° in two minutes, as measured by a calorimeter. The ambient air temperature rose from the same starting point to approximately 380° F. in the same period.

The uninsulated skin took 12 minutes to burn through, and temperatures stayed substantially below those in the insulated door. Reason for these para-

WHILE PLANE IS SLIDING to a stop, fuel sprays into air, forming highly combustible mixture.



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dodoxal results is that the insulation held the heat in once the door had burned through, and kept the heat concentrated against the skin before that, raising the temperature of the metal and speeding the moment when it would be hot enough to burn through.

Escape times (as measured by the pain that would have been experienced by passengers) were $8\frac{1}{2}$ minutes in the uninsulated structure, and only eight in the other. Thus it appears that the insulation currently used may do no good and may do harm in the event of a fire. Also clear is the fact that such glass wool tends to shrink and pull away from the fuselage skin (see photo below) when the flames get at it.

In studying the effects of breathing toxic products of combustion during escape, NACA found that escape time limits imposed by carbon monoxide might be expected to be over one minute and that carbon dioxide's limit was so long that it was reached only once during the tests. In both cases the escape times established by these gases were longer than those due to skin injury and pain. The gases, consequently, were judged to be less important than the heat from the fire.

Smoke itself, aside from the toxic or combustible gases it may contain, immediately serves to cut down visibility within the cabin, and hence hampers efforts of the passengers to escape. In one test objects that were brightly illuminated became invisible because of smoke only 10 seconds after the smoke began to enter the cabin.

Propeller blades provide a source of missiles which may do considerable damage. In the case of hollow steel blades the propeller may twist out of the hub if it comes into contact with something while rotating at take-off power. Such blades sometimes pass through both sides of the fuselage and continue for 400 or 500 feet.

Forged aluminum blades, according to the NACA, may present more of a danger. Instead of traveling in one piece they may break up into a number of fragments. In one case nine holes were made in the wall of the fuselage by bits of the right propeller. The fragments may enter through one side of the fuselage, bounce off the other, and continue to ricochet until their momentum is exhausted.

Solution for this problem, the NACA suggests, is to have the propeller rotating away from the fuselage during the lower half of its arc. If this were done the flying missiles would be hurled away from the wreck instead of toward it.



FLYING FRAGMENTS of propellers can cause considerable damage to fuselage during a crash. Note twisted blades in mid-air, above. NACA suggests design change to have propellers rotating away from fuselage during bottom half of their arc.

Explosions of liquids trapped in hydraulic equipment may also send missiles flying through the passenger compartment. One fragment of hydraulic strut flew about 150 feet after the strut exploded. Since many elements of the hydraulic system are carried within the fuselage, this problem is of considerable importance.

The terrain involved in the crash plays a large part in determining the effects of the accident. On hard, firm ground the distortion of the fuselage structure is likely to be minor. On soft, marshy ground, however, considerable damage may be done, as the mud or soft earth packs into the spaces beneath the floor and presses against the structure.

Out of the tests NACA shaped some suggestions for industry:

- **Insulation** could be provided which would serve as an efficient flame and gas barrier. This barrier should reflect infrared radiation, support the

weight of molten metal dripping upon it, and be strong enough to support itself between bulkheads after the fuselage skin and stringers burn away.

- **Barriers** to flame and gas could be set up where the wing joins the fuselage and in the heating and ventilation systems. Non-melting window panes would be part of this system.

- Placing of fuel tanks as far out on the wings as possible would lengthen the time before the fuselage skin burns through. Barriers would also be needed to ensure that the fuel did not flow down inside the wing to the cabin.

• • •

Specs of Twin Apache Transport Revealed

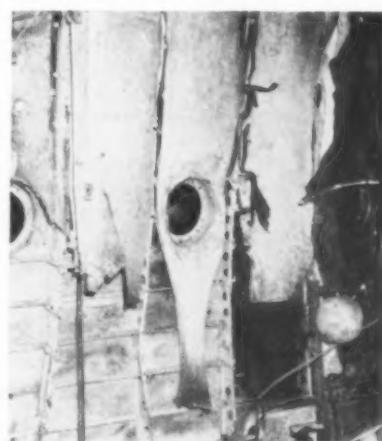
First official specifications on the Piper Twin-Apache four-place transport were released at the recent Piper distributor meeting held in Lock Haven, Pa. The all-metal, twin-engine aircraft has a top speed of 180 mph with an optimum cruise speed of 167 mph at 75% power at 6000 feet.

Other performance figures include: stalling speed, 59 mph; take-off run, 900 feet; landing roll, 670 feet; rate of climb, 100 mph at 1450 feet per minute; absolute ceiling, 22,000 feet; service ceiling, 20,000 feet; single engine cruise, 120 mph. Range is 850 miles with 18.8 gallons per hour fuel consumption at 75% power.

Dimensions include wing span, 37 feet; length, 27.1 feet, height, 9.5 feet; gross weight, 3500 pounds; empty weight, 2158 pounds; wing loading, 17.2 lbs./sq. ft.; baggage capacity, 200 pounds; fuel capacity, 72 gallons.

The aircraft is powered by two 150-hp Lycoming 0-320 engines.

The price on the standard model is scheduled to be \$32,500 and custom \$35,075. Piper expects two-a-day production by March, 1954.



GLASS WOOL insulation tends to pull away from skin during exposure to direct flames, NACA study revealed, affording little protection to passengers.

'Ideal' Corporate Aircraft Design Closer

Three possible solutions seen for financial problems; committee to provide liaison between NBAA, manufacturers.

By Lois C. PHILMUS

CASH seems to be the main obstacle keeping the manufacturers and the business aircraft users from getting together on a new plane design. But a solution may be near, judging from the discussions of the design panel held in conjunction with the National Business Aircraft Association annual convention in St. Louis recently.

In searching for a solution to the financial problem involved in designing and building an executive aircraft, three trends were set forth by the manufacturers and NBAA members:

- Possible military participation in an aircraft smaller than the Convair with speeds in excess of 300 mph;

- Users interested in a new design (eight to ten places, pressurized, multi-engine) might post bonds or deposits to assist a manufacturer;

- Manufacturers would settle for assurance that 300 aircraft of this type could be sold within the next five to seven years.

No Gambling

It was made very clear, however, that no one wants to gamble his resources without substantial guarantee of returns. To speed the project along, NBAA is setting up an aircraft design committee. It is understood that the function of the committee will be to firm up design specifications, consolidate market information, and provide liaison between members and manufacturers in pushing the project along.

Participating in the panel were George Page of Aeronca; Herb Rawdon of Beech; Ed Williams of North American Aviation; J. Gerteis of Cessna; and Art Cruse of Lear, Incorporated. Cole Morrow, chairman of the NBAA board, was moderator.

Williams felt that the Wright Aeronautical R-1820 was the most suitable engine for the "ideal" aircraft, but indicated that a proposed smaller engine (now on paper) might eventually make a four-engine configuration possible.

Some discussion of turboprops in relation to an executive aircraft revealed that small turboprop engines were about seven years off. Page of Aeronca felt, however, that while 75 to 100 mph increased speeds could be achieved, ceilings of 35,000 would be necessary. He felt that this would not be practical for short haul.

Actually, though no commitments were made, it seemed that NBAA was getting closer to its objective. This coming year, through the work of the new committee, should see major strides made in that direction.

Other highlights of the meeting included:

- Accounting Standards Committee Report: Henry J. Boggess (Sinclair Refining Co. and chairman of the committee) presented a set of recommended standards.

It was felt that adoption of such standards would facilitate interchange of cost and statistical data. *Fight expenses* should include crew salaries, crew expenses away from home, aircraft fuel and lubrication, all insurance, and such items as uniforms, in-flight meals, literature, and charts. *Ground expenses* should cover taxes and licenses, hangar charges, landing fees, etc., maintenance and repairs, proportion of ground crew salaries, and part-time salary of chief pilot.

Depreciation costs shown should state depreciation rate, whether it's 12½%, 16 2/3%, 20%, or 25% as the case may be. *Statistical data* should record miles flown, cost per mile, hours flown, and cost per hour. "Business flying," the report states "is not concerned with revenue-miles but with service, therefore NBAA does not recommend cost per passenger-mile as an item subject to standardized comparisons between members."

- Ralph E. Piper, chairman of the technical committee and chief pilot for Monsanto Chemical Corp., reported that a series of regional meetings with NBAA members and CAA tower operators, traffic center controllers, weather bureaus, etc., have resulted in "a better understanding and more efficient movement of business aircraft at no cost to the airlines or any other aviation enterprise."

The committee's study on weather forecasting, Piper reported, has resulted in Commerce undertaking an investigation of NBAA-suggested items. He also told the group that 459 sites have been approved for VOR and 373 are commissioned and operating. Funds are available for further installations which will be made as time permits.

Government and industry officials turned out in force to address the two-day convention.

Herbert O. Fisher, chief of aviation development of the Port of New York Authority, warned the business pilots that they may find themselves co-defendants in suits initiated by communities and individuals against airports. He asked that the group cooperate in any way possible in cutting down noise and helping local airport authorities with the problem. If any of the suits now in the courts are ever won by the plaintiffs, a serious precedent will be set which could close airports to everything but "gliders, balloons, and seagulls."

CAA Administrator Fred B. Lee stated that CAA is willing to set up a businessmen-fliers system of trading information on malfunctions, but he pointed out "the system will only be effective if a representative cross section of corporate aircraft users voluntarily submit reports of defects encountered." He also offered to cooperate with any pilot "in reviewing current mastery of instrument flight."

Check Points

Lee revealed that CAA has a program under way for establishing facilities and check points by which "you can determine the continuing accuracy of your VOR sets." The air carriers, he said, are cooperating by making available their own check facilities to others without cost.

Gordon Bennett, of Under Secretary of Commerce Murray's office, told the meeting that Commerce is trying to trim "the fluff off the cake." The department is willing to listen to advice and suggestions, but, he cautioned, "if you ask for too much, be ready to pay for it." Current objective, he observed, is to get the government out of the aviation business wherever possible.

Col. William S. Lawrence, director of office of transportation for the Federal Civil Defense Administration, requested NBAA to set up a committee to work on the mobilization of business aircraft. Misunderstandings were obvious during discussion periods with DATA and FCDA at the meeting. Lawrence felt the committee would provide closer liaison.

During the business session, Cole Morrow was reelected chairman of the board and Henry W. Boggess was elected to the newly created office of vice chairman. Directors include William B. Beldon, Delos W. Rentzel, and Statler B. Young.

• • •

AMERICAN AVIATION

tonight

This man could almost reach the moon tonight...for he stands at the brink of a new age in the conquest of space, and he knows this:

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STRONG FOREIGN REPRESENTATION at Vickers conference included (front, l. to r.) J. Searl—Philippine Airlines; R. Bono—Argentine; S. Oldfield—BOAC; H. Pike—National Airlines (meeting chairman); R. Lury, So. African Airways. Back row: R. Claisse—Argentine; E. Elkerton—Canadair; E. Lucas—Air France; F. T. Harrington—Vickers.

Industry Split on Non-Flammable Fluids

Vickers hydraulic conference airs divided opinions of carriers; fittings, emergency pumps discussed.

By JOSEPH S. MURPHY

FOR the third successive year Vickers Incorporated of Detroit, Mich., opened its doors earlier this month for an industry exchange of experience on aircraft hydraulic service problems through the medium of its annual transport aircraft hydraulic conference.

Under the chairmanship of National Airlines' chief engineer Howard Pike, the two-day session brought strong representation from domestic and foreign airlines, aircraft and equipment manufacturers, and hydraulic fluid and seal producers.

Discussions during the meeting centered around:

- **Non-flammable hydraulic fluids:** most operators remain undecided on their adoption for general aircraft system use. Both Hollingshead and Monsanto told of new fluids under development.

- **New fittings:** general preference for newer Ermetto type fittings over AN type was expressed by operators using both. Major problem with these fittings is one of training personnel to handle them properly.

- **Emergency hydraulic pumps:** trend is toward use of explosion-proof motors permitting their unlimited use for maintenance and ground testing operations.

Hydraulic fluids—From the airline opinions expressed during the session it is apparent that mixed feelings still prevail as to the adoption of present non-flammable fluids. Not only are the operators hesitant on this point, but a variety of opinions exist as to whether the fluid desired should be completely non-flammable or merely one that will not support combustion.

As to hydraulic fluid preference for airline use, American Airlines' R. C. McGuire inclined toward continued use of mineral oil fluid with a "watch and wait" attitude toward the non-flammable fluids. From the point of view of development status, McGuire pointed out that the non-flammable fluids from all indications are at present pretty expensive, heavier, costly to handle, not compatible with conventional airplane materials, and unfamiliar to airline personnel.

On this same point United Air Lines' Fred Blum explained UAL's move to Monsanto's Skydrol on its fleet of Douglas DC-6B's and Convair 340 airplanes and its testing of Hollingshead Hydrolube H-2 as decisions made on the basis of the safety factor alone. United recognized that in order to realize eventually the goal of a workable non-flammable fluid, development is necessary. He said UAL chose to help in that development, although aware of the po-

tential nuisance problems, added weight, and maintenance involved.

Newcomer to the use of non-flammable fluids, Northwest Airlines' T. A. Droege Müller reported that NWA will soon see service with Skydrol-equipped Douglas DC-6A's leased from the Flying Tiger Line.

Although Northwest recognizes the need for these fluids for safety reasons, he indicated, the general feeling is that the cost is rather prohibitive, there is some worry about the nuisance factors, and some contamination of the Skydrol with mineral oil fluids is expected.

- **Experience:** United Air Lines' testing of Hollingshead H-2 Hydrolube originally planned for six Douglas DC-4 cargo airplanes was discontinued following installation in two planes. Difficulty experienced in correlating reservoir fluid level measurements with the quantity indication in the cockpit was the cause.

Hollingshead's J. W. Woodward said that the unofficial findings determined recently placed the UAL trouble as one of fluid foaming caused by the venturi type hydraulic pressure system in the DC-4.

Whether the UAL test of H-2 will be continued could not be said, remaining a policy question awaiting a formal answer from Hollingshead on the difficulty experienced in the earlier testing.

Of Hydrolube H-2 experience in other aircraft, Woodward told of excellent service in CAA-operated DC-3 airplanes and another owned by the Signal Oil Co. The Signal airplane has accumulated up to 600 hours of H-2 operation over a two-year period and according to Woodward showed good low temperature performance during operation last winter in North Dakota in temperatures as low as -45°F . He also indicated that recent sampling revealed very little change in the fluid characteristics over this period.

The only military experience with Hollingshead H-2 discussed at the session was that of Chance Vought. J. Ludwig reported on difficulties with sticking power control servo valves and a decision to convert aircraft back from H-2 to MIL 5606 fluid. Although the Navy Bureau of Aeronautics had no official representative at the session to report on the overall experience with H-2, a BuAer spokesman told AMERICAN AVIATION that the Chance Vought report was not indicative of any decision on the part of the Navy in the direction of removing H-2 from its aircraft.

Although little was reported on the extended use of Monsanto's Skydrol fluid in general aircraft hydraulic systems other than the forthcoming operation by Northwest Airlines, the com-

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Permits continuous operation at 800° F. or over. Plug and receptacle keyed for positive polarization. Lava inserts.



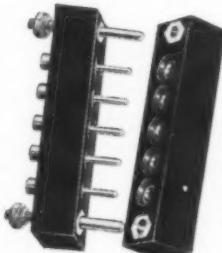
QUICK DISCONNECT

Simply push plug and receptacle together to engage. Pull sleeve on plug shell for instant disconnect. No unscrewing or twisting. Self-polarizing.



PANEL MOUNTING

Monobloc, for small space. Correct alignment of mating pins assured. Easily removable contacts save time and money.



Get BREEZE MARK *Custom Made* ELECTRICAL CONNECTORS

We design and manufacture connectors for special applications where stock parts would not meet requirements.

If high temperature is your problem, our engineers can design a connector with lava inserts to meet your conditions. Perhaps it is unusual structure, dimensions or installation. Call on Breeze!

Where there is no time for awkward unscrewing or twisting, quick disconnects are indicated. We can provide drawer and panel mounting connectors incorporating removable contacts. These will enable you to repair or service one circuit without disturbing others.

We have the specialized experience and the facilities. Tell us your problem in connectors. Our engineering staff is at your service.

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OTHER BREEZE PRECISION PRODUCTS



Ignition Shielding



Flexible Metal Tubing



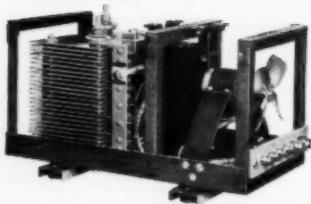
Aeroseal Hose Clamps



Actuators



*Federal supplies the 50-Amp. Transformer-
Rectifier unit used in the Stratofortress...
"America's new double-edged weapon"*



FTR 3146-BS AIRBORNE POWER SUPPLY

- AC Input: 195-210 volts
- DC Output: 50 amps., 24-31
- 380-420 cycles; 3 phase, volts; resistive-inductive load.
- Ripple: 5% maximum
- Weight: 19 pounds
- Dimensions: 15½" long; 9" wide; 8¾" high.

Over 300,000 pounds of precision production . . . 185 feet from wing tip to wing tip . . . drawing its unique speed and ceiling from eight powerful jet engines! That's the Boeing B-52 . . . built to serve as a deterrent against aggression . . . as a weapon of offense, if needed by our strategic air arm!

In the "tradition of rugged dependability" established by Boeing's famous Flying Fortresses and Superforts, Boeing has selected Federal's 3146-BS Airborne Power Supply to provide the B-52 with a DC output of 50 amperes, 28 volts.

Federal's 3146-BS is only one of a complete line of rugged, compact and efficient airborne and ground power supplies developed to meet aviation's growing trend from generated DC to 400-cycle AC . . . to furnish dependable DC power where required. Federal equipments are designed without expendable parts that require frequent replacement. And all are powered by Federal Selenium Rectifiers . . . first in the field . . . outstanding for long service life and trouble-free performance!

Whatever your DC requirements, write to Dept. E-543.



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pany now estimates that a total of 4600 gallons of aircraft and supercharger hydraulic systems are Skydrol operated. An added 5400 system gallons is represented in airplanes currently on order.

Operators' reports of Skydrol performance in the Douglas DC-6 series supercharger systems continue to indicate that it is doing a good job, with the records showing a general reduction in the percentage of hydraulic pump failures where Skydrol is used.

In this application of Skydrol the justification for the use of the higher priced non-flammable fluid is an economic one as well, with the \$12-per-gallon Skydrol now being operated to periods above 4000 hours before periodic replacement. The recommended practice for mineral oil systems calls for its replacement at 250 hour periods.

New fluid development—Both Monsanto and Hollingshead representatives told of development work on new fluids. Monsanto's efforts are being directed at high temperature fluids and the development of Skydrol 500 with a low-temperature rating of -65° F. as compared with the -40° F. for conventional Skydrol. Hollingshead also indicated its attention was directed toward high temperature fluids as well as advanced ver-

sions of Hydrolube H-2 with improved corrosion inhibiting components being developed for the Navy.

W. H. Millet of Linde Air Products reported on continued laboratory and bench testing by the Navy of its Hydrolube AC, also a water-based fluid, but indicated that no flight testing had been done to date.

Flareless hydraulic fittings—Both United Air Lines and Trans World Airlines expressed favor toward the newer type Weatherhead Ermetto hydraulic tube fittings over the standard AN fittings in terms of maintaining a "leakproof" system.

The major problem recognized by both operators with the newer fittings was one of educating personnel to back off and then tighten the Ermetto fitting instead of the usual practice with AN fittings to continually tighten to stop leakage.

UAL indicated that its training program in this respect is a continuous one necessitated by the continued influx of new mechanical personnel, but that the major indoctrination on the new fittings in the Convair 340 began in May of 1952 and continued through the better part of the spring of 1953.

Skydrol resistant paint—Two new paints were discussed at the session. Widest experience was reported on a product called Cat-A-lac, manufactured by the Finch Paint Co. of Los Angeles at a cost of approximately \$24 per gallon.

American Airlines' R. C. McGuire indicated that AA had accumulated 1674 hours using Cat-A-Lac on a DC-6B with the paint still in fairly good condition. American is also testing a similar product manufactured by the Andrew H. Brown Co. of Dallas, Texas, but has not accumulated sufficient test time to permit a report.

Emergency hydraulic pumps—Trend toward use of explosion-proof motors on electric-motor-driven emergency hydraulic pumps was evident. Operators reported a wide variety of time limitations imposed on the use of these pumps for other than in-flight emergencies, with indication that these restrictions are being discarded with the changeover to explosion-proof motors.

Single accumulator systems—Use of dual main system hydraulic accumulators in newer Douglas transports was reported. American is taking delivery of the DC-7 with one accumulator and the Flying Tiger Line is adopting the change on

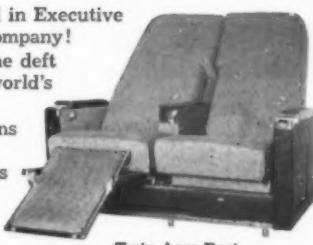
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Dow Corning 4 meets all the requirements of Specification AN-C-128a, except that it is made in a consistency which is more adaptable to a variety of applications. It is highly resistant to moisture, oxidation, ozone, and corona discharge.



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Ready to go! "Fired up" and ready to take off, to be airborne and moving at furious speeds in a matter of seconds.

The components that make up a jet must be right. They must be produced exactly as designed. Turning them out calls for the highest standards of craftsmanship in forming and welding. The aircraft industry demands it!

Years of experience in fabricating stainless steel, aluminum alloys and other allied materials has brought Lavelle widespread recognition as a truly unique and reliable subcontractor.



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the DC-6A airplanes. Explanation for current change is that the original DC-4 was fitted with the dual installation to augment system reliability and that a combination of accumulator diaphragm design improvement and recent test results indicate that the change to a single-unit installation can be made without materially affecting the performance of steering, brake, landing gear and flap systems.

The Douglas Aircraft Co. originally dropped the second accumulator installation on the later model DC-6B's and the DC-7, and subsequently made the change a customer option on the DC-6B.

Shop tools—Northeast Air Lines has developed a tool to simplify the removal of the cylinder bearing locking pin in Vickers fixed displacement pumps using the loose pin and pipe plug. The NEA tool, as described by engineer D. Sperry, is a knock-puller type fixture where the pin is threaded and the puller is screwed onto the pin for removal. Other airlines told of variations of duck bill and needle-nose-plier modifications designed to do the same job.

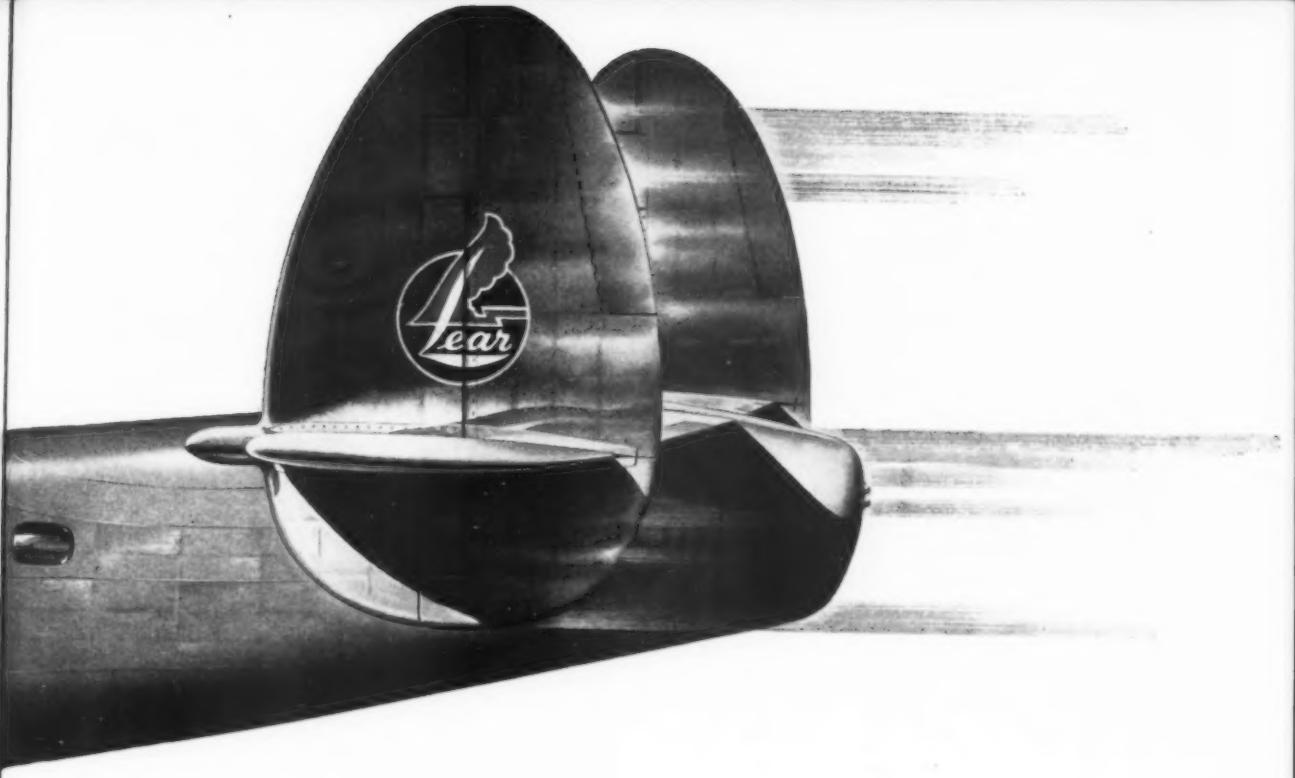
Among the conference sidelights was a general discussion of two major aircraft hydraulic system reworks now in the mill, one of the Convair 340 to reduce system pressure surging due to high cycling of the unloading valve, and another of the Lockheed Constellation series to provide "crossover" protection between the primary and secondary systems to permit use of hydraulic services in event of two engine out operation.

Major change in the Convair 340 is the introduction into the system of a N. Y. Air Brake-manufactured variable displacement hydraulic pump on the left engine to replace the fixed displacement pump formerly used. The modified system is slated for an accelerated service test on two United Airlines Convairs along with one each operated by Braniff, Delta-C&S, and Continental.

With the variable pump installed in the Convair, system cycling will be reduced by allowing this pump to supply the demands of the hydraulic-motor-driven cabin fan, whereas the fixed pump will be used to supply the hydraulic power system.

Benefits expected from the rework, which has already undergone extensive instrumented flight and ground testing at Convair, include prolonged tube and flexible hose life, better seal ring life, reduced maintenance of the unloading valve, and lower system and cabin fan noise levels.

The change to the Constellation system proposed by Lockheed will permit the crew to obtain hydraulic pressure from the airplane's primary hydraulic system to operate the landing



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Over 270 mph cruise. Increased range. Shorter take-off. Faster climb. Improved single-engine performance. Stronger structure. Lower cabin noise and vibration level. Larger cockpit. Better visibility. Improved control pedestal design and arrangement. Easier and lower cost maintenance. Lower operating costs. Superfine cabin design and furnishings.

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How can so much be done for a Lodestar? By applying thousands of engineering man-hours, thousands of shop-hours, hundreds upon hundreds of wind tunnel and flight-test hours, and 20 years' first-hand study of executive aircraft requirements.

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gear, brakes, nose steering, and other secondary services in the event the secondary system is disabled by a double engine failure.

Under the revised layout the Constellation's secondary hydraulic system is completely divorced from the primary booster system and is used for secondary services only.

By installation of a switch at the flight engineer's station and a motor-operated shut-off valve in place of the normal crossover check valve, it will be possible for the primary system to supply the secondary services, or for the secondary system to feed both the boost system and secondary services. As an added safety feature, Lockheed proposes a manual override on the motor-operated valve to permit its operation in event of electrical failure.

According to present estimates, Lockheed has a 10-month schedule for parts delivery if orders are placed before February 1, 1954. Although the final cost of the modification kit has not been set, the airlines have been given an estimated price of \$730 for the Super Constellation kit and \$650 for the Constellation series, with no more than a \$100 variation anticipated.

• • •



West Coast Talk

By Fred S. Hunter

Western Air Lines recently held a board meeting in Seattle. At the invitation of **William M. Allen**, president of Boeing, the directors went out to Renton to look at the prototype of the Boeing 707 jet transport, now in process of construction.

"Our interest," **Terry Drinkwater**, president of WAL, hastened to explain, "was entirely academic."

Seems hardly possible the Lockheed Constellation is now almost 15 years old. But it was conceived in 1939. We know at least one airplane salesman who thinks it will last 15 years more. The first Constellation cost \$675,000. By coincidence, that is exactly the price of a Convair 340 today.

Here's an example of the kind of airport planning that apparently is going to be essential in the future. Warned that the owners of 27 acres of land west of the Los Angeles International Airport were planning to sub-divide, the board of airport commissioners promptly moved in to acquire the property. Instead of having a new group of householders to complain about noise, the airport, through this and other land acquisition actions, will have a clear slot all the way to the ocean for take-offs from Runway 25L, which is the one used by the Douglas and North American factories. The move also will open the way for extension of this runway to 12,500 feet. It can be extended even further, more than three miles out to the beach, if the city wants to spend the money to cut down the sand dunes out toward the shore.

NAMES IN THE NEWS—W. C. Rockefeller, Ray Ryan and Nels Stulheim, all formerly with Convair, comprise a west coast group for Floyd Odlum's Atlas Corp., with offices in La Jolla . . . Jim Edwards, who returned to Douglas after a period as chief engineer of Hiller, is doing preliminary design work for Ed Burton at the Santa Monica division . . . Gerry Busch, once with Slick, later Douglas, is Gene Root's economist in the new development planning group at Lockheed . . . Donald W. Douglas is building a new \$100,000 home in Rolling Hills . . . Pete Girard, chief aerodynamist for Ryan, is a soaring enthusiast and owns a sailplane . . . Woody De Silva, Los Angeles Airport manager, swept the boards again at the L. A. County Fair with his pickles . . . Clyde Barnett, aviation department manager at the L. A. Chamber of Commerce, made no less than 25 trips to the Salton Sea as an FAI timer and then couldn't get away and missed the show when Lt. Col. Pete Everest set the new 754.98 mph record.

WEST COAST MISCELLANY—UAL crews refer to their Boeing Stratocruisers as "pineapple barges," which they sometimes are on flights coming this way . . . The way the Los Angeles papers played up the breaking of 33 windows by the YF-100's sonic boom at Palmdale makes one wonder what's important these days, the breaking of a bunch of windows or the news of a great airplane . . . AiResearch Manufacturing Co. is going tropical in a big way in Los Angeles with 10 swaying palm trees planted in front of its plant . . . Philippine Air Lines sold approximately \$55,000 of air transportation in one package to Band Leader Xavier Cugat for his tour of the Orient . . . Boeing has produced more than 400 C-97's, and its backlog carries its production into 1955, which puts the Seattle manufacturer up among the leading transport producers . . . North American has a big F-86D modification program coming up, which it will put in Fresno . . . Meletron Corp., which George A. Starbird started in a small house and backyard in Hollywood, observes its 15th anniversary this year . . . Cee-Bee Chemical has developed a new tank stripper which will simplify this job still further . . . Address of new Ramo-Woolridge Corp. is 6316 West 92nd St., Los Angeles 45, Calif.

Books

CEILING UNLIMITED, by Lloyd Morris and Kendall Smith. The Macmillan Co., New York City, N. Y. \$6.50; 417 pp.

This thoughtful survey of the last 50 years of powered flight is distinguished from various similar volumes which have recently appeared by virtue of its reliance on text rather than pictures (although it includes a good selection) and by the quality of the writing, which is high.

. . . W K

I FLY AS I PLEASE, by Marion Rice Hart, Published by the Vanguard Press, Inc., New York. 247 pages. Price \$3.00.

The author presents an account of her flying adventures and experiences. She learned to fly while in mid-life and relates her reactions in narrative form.

. . . LCP

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**With detailed scale models
on miniature assembly lines . . .**

Fairchild Puts 3-D Into Engine Production

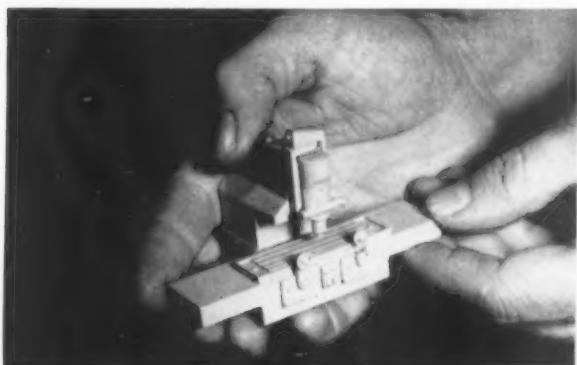


MODELS RANGE from replicas of 12" bench grinders to 30' broaching machines. Desks are complete with waste baskets.



PLANT LAYOUT ROOM at Fairchild Engine Division holds scale model of entire plant, reduced to $\frac{1}{4}$ " equals 1'.

MOVEMENT OF MACHINES to fit changing production requirements can be planned quickly and accurately with the help of the three-dimensional models.



BESIDES HELPING IN PRODUCTION PLANNING, the scale model is useful in safety, industrial relations, engineering and maintenance.

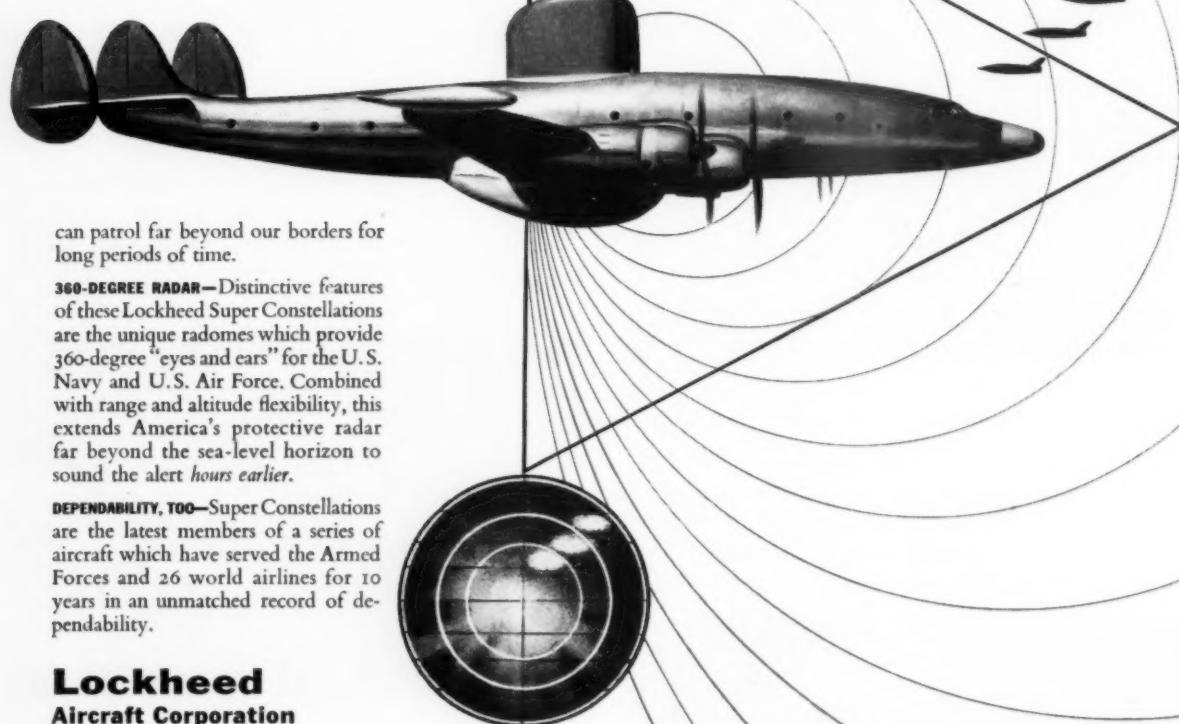
Leadership Demands Constant Achievement

Early Warning!

Super Constellations vital to U.S. defense

If America should ever be attacked from the air, new Super Constellations will stretch critical "alert time" from minutes into hours. Here's how they'll do it:

LONG RANGE PLUS LONG ENDURANCE—Large fuel capacity and low fuel consumption of turbo-compound Super Constellations provide remarkable range and time aloft as Early Warning Aircraft. This means these "flying sentinels"



can patrol far beyond our borders for long periods of time.

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DEPENDABILITY, TOO—Super Constellations are the latest members of a series of aircraft which have served the Armed Forces and 26 world airlines for 10 years in an unmatched record of dependability.

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Continental Defenders Comprise Unique Team

Of all U. S. aircraft manufacturers, the Lockheed Aircraft Corporation today produces the most complete team of airplanes capable of nearly every function of air defense.

With increasing emphasis on continental defense needs, Lockheed is building a record volume of specialized defenders of many types. And production of all Lockheed models is on schedule.

Important members of this Lockheed defense team are these three airplanes:

1. EARLY WARNING—Lockheed Super Constellations, with distinctive radar humps, are "flying radar stations" capable of hovering long hours at high altitude far beyond U. S. borders to warn against attack. (Called WV-2 by Navy, RC-121-D by Air Force.)

2. FLYING SENTRY—For long-range, long-endurance patrols at lower levels, the Navy uses P2V Neptune Bombers, especially designed to protect U. S. coastlines from sneak attack by submarine. Secondary missions: rocket attack, mine laying, torpedo attack, photo reconnaissance.

3. ALL-WEATHER JET INTERCEPTOR—While both the Early Warning Aircraft and the P2V Neptunes are on constant patrol, Lockheed F-94 Starfires are based at strategic continental points, ready to intercept any attacker in daylight or darkness, regardless of weather.

Peace today is as firm as the strength behind it, and other Lockheed models in production contribute toward this peace. These include the T-33 Jet Trainer (Navy, TV-2) in which 9 out of 10 of our jet pilots earn their wings, and the C-130 military transport, only transport designed from the ground up for turbo-prop power.

PLANS FOR TOMORROW'S PLANES—Several new Lockheed models will be tested early next year. One of these will be the XF-104 Day Superiority Fighter. Others are too secret to be talked about. And designs 10 to 15 years from now are now taking shape in research by a special corps of engineer-scientists at Lockheed.

Extra Section

By Wallace I. Longstreth
Rates and Tariffs Editor



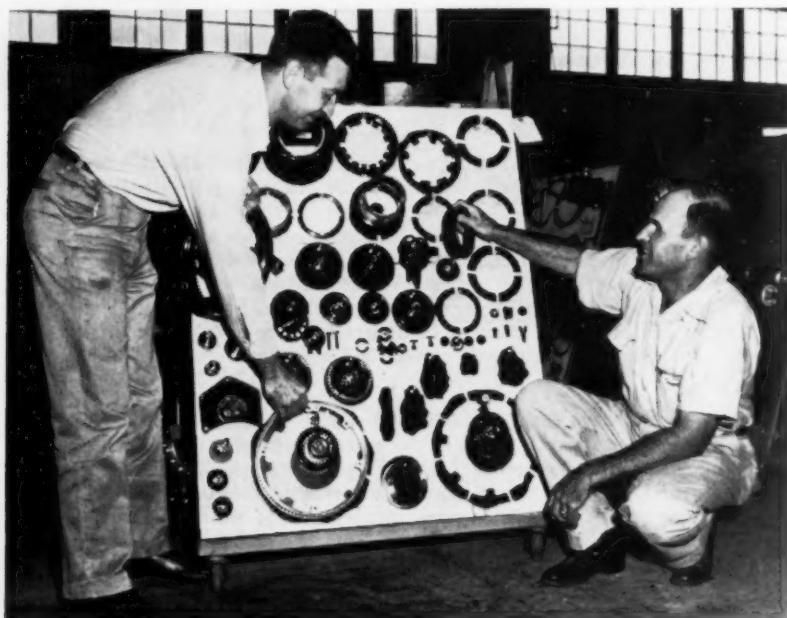
In the days when airline systems were smaller, and the number of pairs of points not so numerous, the tariffman's life was less difficult. With 25 cities being served, he had to calculate fares and rates for 300 pairs of cities. Doubling the number of points served gave him 1225 pairs of cities to worry about. Today, a medium-size airline, such as Capital with 52 points, has a possible 1326 city pairs. All told, the 548 cities served by scheduled airlines in the United States offer a potential 170,236 fares, if only one fare were figured from each city to each other city. The long columns of figures resulting from all of these pairs of points have taught the tariffman caution and a warmth for that which is exact.

In the airlines' consolidated specific commodity rates tariff, for instance, there is listed in the alphabetical index of commodities seven different categories for clothing: (1) Apparel, wearing; (2) Apparel, wearing, except rejected or returned wearing apparel (on hangers in bags); (3) Apparel, wearing, except wearing apparel on hangers; (4) Apparel, wearing (not on racks or hangers), excluding hats and millinery; (5) Apparel, wearing (not on racks or hangers); (6) Apparel, wearing (not on racks or hangers), including footwear, gloves, hats, and millinery; and (7) Apparel, wearing (on racks or hangers). In the same book, Printed Matter is treated with even more care. It has eight separate listings, starting with the all-inclusive Printed Matter, and then detailing various stages excluding or including Magazines, Books, Advertising Matter, or other despoiled paper.

Such exact definitions reflect the compromise between the sales department and the comptroller's office. "Fill unused cargo space," the head salesman says. "Don't give away the airline's service by putting in special rates for stuff that is already moving by air," says the comptroller. Several factors, such as volume and regularity of movement enter into the specific commodity rate story, but most important is filling unused space. Toward that end, the airlines developed lists of items that could move at special rates. In a short time the lists were so long as to be unwieldy. Between New York and Chicago there was a list of commodities that started, "Abrasives, Adhesives . . ." ran through "Shoes . . ." and "Tires . . ." and closed with "Zippers" some 120 items later. Customers had trouble (as did airline employes) determining what shipments qualified for special rates. Simplicity was added. An "All Commodities, except . . ." rate was introduced, with the exceptions limited to a dozen or so items. But the additional costs of handling live animals, ladies' hats, flowers, and so on, were rediscovered. The list of exceptions grew and grew, until now, complete with footnotes stating exceptions to the exceptions, it is giving customers trouble (as well as . . .).

Finding the rate in the tariff is only part of the problem. Finding the proper tariff, and the rules, "which govern, except as otherwise noted," may take a bit of research. As of today, there are 12 air freight tariffs issued by individual scheduled airlines operating within the U.S., plus the consolidated air freight tariffs issued by Air Cargo, Inc., for the scheduled domestic lines. A complete set of ACI tariffs includes: one Rules tariff, one General Commodity Rate tariff, one Specific Commodity Rate tariff, two Pick-Up and Delivery tariffs, one Restricted Articles tariff, one Station Directory, and one Tariff Circular. This array of reference material, constantly being revised for currency, has driven some tariffmen to declare, "you don't have to be crazy to be a tariffman, but it helps." This appears to be a generalization without sufficient observation—there are people who feel that it hasn't helped a bit.

Maintenance Bulletin Board



Parts Rack Guides Replacement at BNF

Braniff Airways' engine overhaul shop in Dallas, Texas, is sporting a new time-saving engine parts rack which gives a ready indication of all parts that require replacement when an engine is inspected after teardown. The device is called a silhouette parts rack and was designed and built by Braniff shop mechanics.

Four racks are needed to hold the complete engine parts assembly. After an engine is disassembled and inspected, faulty units are replaced and those that are found serviceable are mounted on the appropriate rack according to a silhouette and index number plate on the rack face. The next step is to have a lead mechanic check each of the racks and originate requisitions (according to index numbers) for all parts missing from the board. This procedure completely eliminates the need to refer to an engine parts catalog.

Braniff finds that the engine boards also make parts more accessible to the mechanic. When a rack is completely refitted with all assemblies needed for engine build-up, it is wheeled as a unit to the mechanic's work area for assembly. Parts damage is reduced through rack mounting by preventing the chipping and denting that occurs when they are stacked.



EXAMINATION of a wing spar splice bolt hole for corrosion is conducted using optical instrument made by Northwest Airlines mechanic.

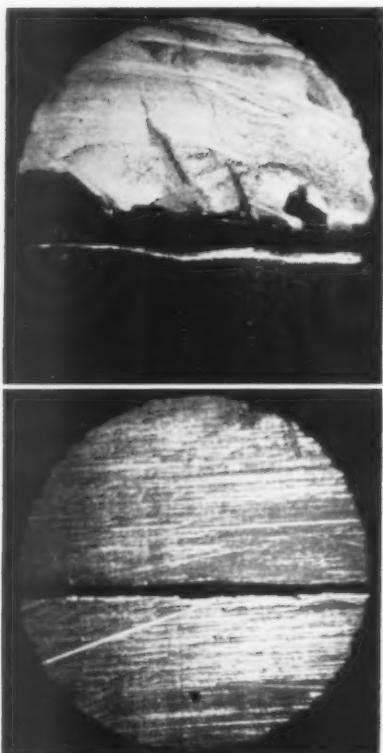
NWA Technique Checks Wing Bolt Corrosion

Northwest Orient Airlines reports complete success with a new method of controlling corrosion found in Boeing 377 wing spar splice bolt installations. A galvanic corrosion discovered by NWA on the Stratocruisers during recent Pattern "N" inspections was attributed to the contact of dissimilar metals in the installation, the bolts being high strength steel and the spars aluminum.

A control program set up by Northwest engineers called for three steps:

- Cadmium plating of all spar splice bolts.
- Adoption of uniform bolt-to-hole clearance. Bolt holes were reamed to remove all traces of corrosion and to provide .0011" to .0015" clearance to oversized plated bolts.
- Use of a chromic acid wash on spar splice bolt holes. This step along with the bolt plating controls the electrolytic action between the bolts and spar metal which NWA feels caused the corrosion.

In reaming the bolt holes, the original Boeing Airplane Co. bolt-to-hole clearance is altered from .0003" to .0025". This, the airline engineers expect, will keep the cadmium from being scraped off during bolt installation and stop the galling of both the bolt hole and bolt.



LARGE CRACK in pictures above is space between lower and upper spars. In photo at top, dye-check reveals corrosion in form of small cracks running from center toward top. Bottom photo shows result after reaming and washing with chromic acid.

A T R U E S T O R Y O F A I R W O R K



The President drove the **TRUCK**

The phone call came through long after the plant closed, and all but the executive staff had gone home. That was over six hours ago. Now, it was midnight on a dark and lonely mountain road.

One more curve in the endless series of uphill turns. Then the headlights picked up the small airstrip . . . the crippled plane . . . the anxious looking men waiting in front of the hangar.

Airwork was delivering an overhauled engine to a customer in trouble. The president drove the truck over 200 miles that night. Like every man in the company, he was taking his place in Airwork's tradition of Personal Service to the customer.

That tradition marks a business where the customer and his needs will always be important. You may never face an emergency as grave as that one. But the same interest and care will be ready to serve you, whether you need an engine, an engine accessory — or just an engine part.

Some of these days you will see a cream and blue Bonanza marked "Airwork Corporation". Talk to the men with it. Talk instrument grouping, ILS approaches . . . do some hangar flying.

You'll see why so many pilots and plane owners — people like yourself — are switching their engine and accessory overhauls and exchanges to Airwork — the company of, by and for pilots.

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B-52 STRATOFORTRESS and B-47 STRATOJET equipped with **SAGINAW** **BALL BEARING SCREWS**



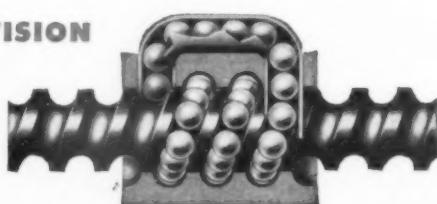
Saginaw Screws actuate the trim tabs on the new B-52 Stratofortress, built at the Seattle plant of Boeing Airplane Company, and both trim tabs and landing gear controls on the new B-47 Stratojet, built at the Boeing plant in Wichita. These highly efficient screw mechanisms transmit the rotary-to-linear force through rolling steel balls with only a fraction of the torque required for ordinary thread-to-thread screws, thus resulting in important weight savings. They can be combined with electrical, hydraulic or pneumatic units. Write today for our Engineering Data Book.

Saginaw STEERING GEAR DIVISION

GENERAL MOTORS CORPORATION

SAGINAW, MICHIGAN

MANUFACTURERS OF SAGINAW POWER STEERING



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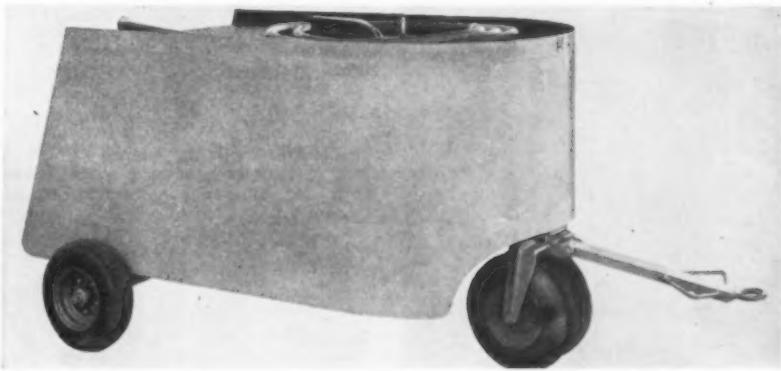
NOV

New Products

Pressure Tape. The Minnesota Mining and Manufacturing Co. has introduced a new pressure-sensitive tape for high heat masking of aircraft and electronics equipment, particularly such treated metals as anodized aluminum, pickled steel and dichromated magnesium.

Called tape No. 214, the new 3M product is intended for masking use in oven temperatures up to 325° F. It can be removed cleanly without leaving adhesive deposit.

Address: Minnesota Mining and Manufacturing Co., Dept. AAP, 900 Fauquier St., St. Paul 6, Minn.



Flexible Aircraft Servicing Unit

Fuel-A-Plane, a new portable servicing unit for general aircraft use, is adapted for testing, calibrating, fuel transfer, dispensing or de-fueling operations, according to its producer, the Harman Equipment Co. It is also designed to meet the requirements of small airports for on-the-spot fueling at any part of the field.

Arrangement of the Fuel-A-Plane provides an open compartment in the rear for convenient access to any type of dispensing unit. The device is equipped with a demountable, self-contained pumping unit which can be either a gasoline engine, electric-motor-driven pump, or hand-operated pump. A pump meter, filter,

and fuel-water separator are included where required.

Mondeling for filling the tank, or for fueling and de-fueling of aircraft, is incorporated in the dispensing unit design. If aircraft pumps are to be used for these operations, the unit can be delivered without the dispensing equipment.

Capacity of the Fuel-A-Plane is variable. Model 6120 is shown here (see photo) with a 300-gallon tank, but is also available with 125- or 220-gallon tanks.

Address: Harman Equipment Co., Dept. AAP, 3605 E. Olympic Blvd., Los Angeles, Calif.



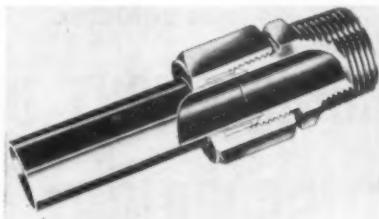
VHF Unit. A portable two-way VHF communications unit which weighs only 22 pounds and can be placed into operation in a matter of minutes has been introduced by the LearCal Division of Lear, Inc. Packaged in an all-metal carrying case, the Lear LTRA-6P transmitter-receiver measures 8½" by 10¼" by 12".

The Lear unit consists of a tunable VHF receiver with a frequency range of 108 to 127 mc, a 2-watt, 12-channel, crystal-controlled VHF transmitter with a frequency range of any 4 mc band from 118 to 150 mc, and a standard broadcast and range band low-frequency receiver. A 75 mc marker beacon receiver is also included.

The LTRA-6P is available for operation from either a 12- or 24-volt power source and has a self-contained dynamotor power supply. An aircraft type carbon microphone and saddle are mounted conveniently on the case and a five-inch loudspeaker is built-in with two jacks available for use of earphones.

For operation of the communications unit it is only necessary to connect the power cable to the primary electrical system of the airplane or ground vehicle and to plug in the antenna.

Address: Lear, Inc., LearCal Division, Dept. AAP, 11916 West Pico Blvd., Los Angeles 64, Calif.

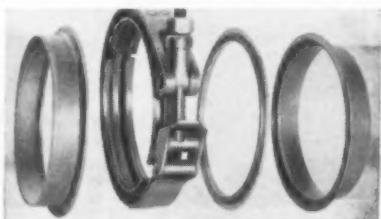


Tube Fitting. A new flareless aircraft tube fitting which is said to exceed the performance requirements of specifications AN-F-27 and MIL-F-5506A has been announced by the Aircraft Fitting Co.

Available in all popular shapes from $\frac{1}{8}$ " to 2" in steel, brass, aluminum, and stainless steel, the new fitting is designed

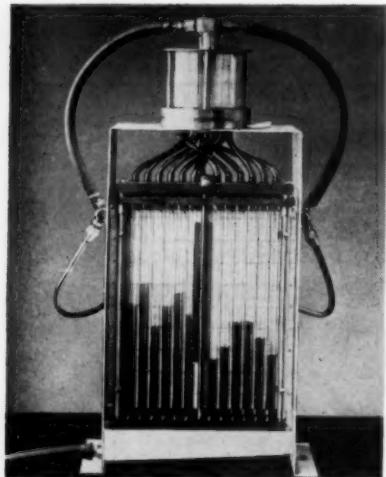
to provide a positive stop action for tightening. To assemble the tube it is merely inserted in the fitting and tightened with a wrench. The fitting may be reused by replacing the sleeve.

Address: Aircraft Fitting Co., Dept. AAP, 1400 E. 30th St., Cleveland 14, O.



Coupling System. A new lightweight coupling system for high temperature, high pressure aircraft ducting installations has been announced by Marman Products, Inc. The new Marman ducting joint is made up of two steel flanges which are welded to the ducting, a V-band coupling which permits rapid assembly of the joint, and a self-aligning metal gasket for positive sealing.

Address: Marman Products Co., Dept.



Patternator. The Patternator, a portable device for measuring jet engine fuel nozzle spray dispersion, provides a fast and inexpensive means of pre-installation testing to assure proper atomization, according to its manufacturer, Jet-Heet, Inc. The test unit weighs 25 pounds, measures 10" wide, 6" deep, and 20" high, and requires no electrical power supply for operation.

In its operation, the Patternator divides and channels segments of spray into glass columns and measures the flow in each segment to determine the dispersion pattern as well as total flow. The device is adapted to use with nozzles of varying sizes and types.

Address: Jet-Heet, Inc., Dept. AAP, 152 South Van Brunt St.; Englewood, N. J.

OXYGEN EQUIPMENT: New 51-page illustrated manual deals with "Oxygen Breathing Equipment for Passengers and Crew," and is particularly aimed at maintenance personnel. Designated Catalog 53. Prepared by the Puritan Compressed Gas Corp., 2012 Grand Ave., Kansas City 8, Mo.

CONTROL RODS: "Here's Where to Use It" is the title of a booklet prepared to show engineers how to use mechanical disconnects in control rods. Published by Durham Aircraft Service, Inc., 56-15 Northern Blvd., Woodside 77, N. Y.

AIRCRAFT REPAIRS: CAA Manual 18, dealing with "maintenance, repair and alteration of airframes, powerplants, propellers and appliances," is now available from the Superintendent of Documents, U. S. Govt. Printing Office, Washington 25, D. C. at a domestic cost of \$1.75 and foreign—\$2.25.

FIBER GLASS: "Possibilities Unlimited" includes aviation applications for superfine fiber glass, conceived by Fiber Glass division of Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.

SWITCHES: Micro division of Minneapolis-Honeywell Regulator Co., Freeport, Ill., has prepared Data Sheets 64a, 66, 68a, 71, P74, and P75 to present technical information on, respectively, low-force switches with lever actuators; high-precision, roller plunger switches; double-pole, double-throw switches; subminiature switches; magnetic blow-out switches; and one way actuation switches.

STAINLESS STEEL: A new method of hardening stainless steel is presented in a new 64-page booklet written by C. U. Scott and published by C. U. Scott & Son, Inc., Rock Island, Ill.

WATER FILTERS: Marvel Engineering Co., 625 W. Jackson Blvd., Chicago 6, Ill., has prepared Catalog No. 300 to show how all sump and line type filter models were adapted for water applications.

SPEED REDUCERS: Technical Data Sheets Nos. 10 and 11 describe new bantam size speed reducers, nominally rated at 1/10 and 1/20 hp, as manufactured by the Metron Instrument Co., 432 Lincoln St., Denver 3, Colo.

SELECTION CHART: Ampex Electronic Corp., 230 Duffy Ave., Hicksville, L. I., N. Y., has prepared a three-color chart which is said to make possible the quick selection of Ampex rectifiers, thyratrons, and ignitrons.

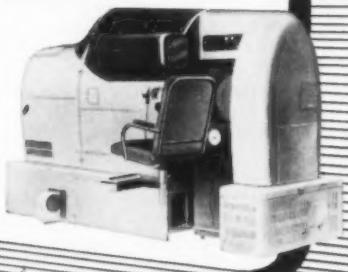
TAPS: Bulletin ST-53 contains tap sizes, thread forms, and latest price information on Standard specific taps. Issued by Detroit Tap and Tool Co., 8615 E. 8 Mile Rd., Roseville Mich.

CAPACITORS: Data on 134 types of replacement capacitors is contained in a 36-page catalog published by Cornell-Dubilier Electric Corp., South Plainfield, N. J.

LODESTAR CONVERSION: William P. Lear's Lodestar conversion project is described in a fully illustrated spiral-bound book available from Learcraft Conversions, Inc., Santa Monica Airport, Santa Monica, Calif.

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CORPORATION • WOOD-RIDGE, N. J.



People

MANUFACTURING

Dr. L. T. E. Thompson has been appointed executive vice president of The Norden Laboratories Corp. Dr. Thompson, formerly a vice president of Norden, has just resumed full time duties with the company after having served as vice chairman of the Research and Development Board of the Department of Defense.

James R. Bradburn has been named vice president in charge of Consolidated Engineering Corp.'s Computer Division, effective December 1. **Joseph H. Lancor** will succeed Bradburn as vice president in charge of engineering, and **Walter B. Claus** will move up to Lancor's old post as director of Consolidated's Transducer Division.

W. A. Patterson, president of United Air Lines, has been elected to the board of directors of Westinghouse Electric Corp.

Robert F. Windfohr, of Fort Worth, Texas, recently became the first Texan to be elected to the board of directors of Consolidated Vultee Aircraft Corp.

William E. Zisch has been elected vice president of the Aerojet-General Corp., subsidiary of The General Tire and Rubber Co. Zisch, who joined Aerojet shortly after company was formed in 1942, was made general manager of the concern in 1948, and now holds the title of vice president and general manager.



Zisch



McMurray

AIRLINES

Kay McMurray, former United Air Lines pilot, has been appointed executive vice president of the Air Line Pilots Association. McMurray's appointment

fills the vacancy created by the death of Sterling Camden last June.

R. W. Knight, former deputy director of Flight Safety Research of the United States Air Force, has been appointed assistant to the president of Resort Airlines. **William H. Meranda**, Resort's vice president of operations, has resigned in order to devote himself to the receivership of U. S. Airlines, certificated all-cargo airline.

Donald B. Doolittle has been elected to the newly created position of vice president engineering and production for All American Engineering Co.

Willard F. Rockwell, Jr., president of Rockwell Manufacturing Co., has been elected to the board of directors of Allegheny Airlines.

Gwin Hicks, one of the organizers of Empire Airlines, which last year merged with West Coast Airlines, has been appointed special assistant to the president of Lake Central Airlines.

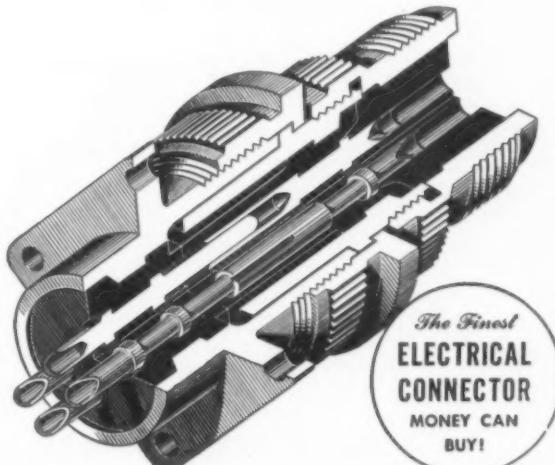
British Overseas Airways Corp. announces that **Winston Bray** has been named sales planning manager instead of manager, North America, to succeed **J. R. Stanton**, who has gone to London to take over the post of general sales manager for BOAC. **R. H. Trench Thompson** is being brought from his position, BOAC manager in Pakistan, to assume the North America position, December 1.

Jack K. Svitzer has been named director of Analysis and research for Allegheny Airlines.

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Airline Commentary

By Eric Bramley

THE Air Traffic Conference has taken a big step forward in adopting standard interline reservations procedures (SIRP). Formerly, such procedures have been scattered through a number of ATC resolutions. This led to difficulties—airlines had to distribute a lot of papers to their employes, and interpretations of resolutions weren't always the same. Now, after many months' work, the resolutions have been merged into one document (some 50 pages) and further interpreted as to the airlines' responsibilities to the customer and to each other. It's a major development—standard procedures are badly needed, not only for interline reservations but for a number of other things.

Here's a story of how passenger service pays off.

Rod MacInnes, public relations director for Trans-Canada Air Lines, received a call one day from a Boston businessman who had interests in Alberta Province. The gentleman had a reservation on TCA and asked Rod if the airline served doughnuts on board. The answer was no. The customer insisted he liked doughnuts and inquired whether arrangements could be made to have some put aboard his flight. Instead of passing it off as a screwball request, Rod called passenger service and asked that a dozen assorted doughnuts be furnished. This happened a second time, and again he obliged.

Some time later, a freight official of Canadian National Railway (which, like TCA, is government-owned) asked Rod if he knew anything about some doughnuts. He explained that CNR had just landed one of the biggest coal contracts in its history, and all the railroad knew was that the man who gave the contract said it was due to two dozen doughnuts and a fellow by the name of MacInnes in Montreal would know about it.

The many combinations of routings, fares and stopovers available on flights to Europe make life difficult for airline salesmen and travel agents. Scandinavian Airlines Systems has helped ease this situation considerably with its Stopover Manual. On a series of maps, you can tell at a glance—by following the arrows—all routings possible on any through fare. Also, every map page contains a listing of fares, eliminating the need for construction. It's an excellent way of simplifying a complicated job. Should prove particularly valuable to travel agents.

If you're going to commit a crime, don't buy airline trip insurance. Two Chicago hoodlums flew to New Orleans, fatally beat a used car dealer, robbed him and returned to Chicago. They used phony names when purchasing tickets. However, insurance was such a good buy that they took out a couple of policies—which revealed names and addresses of beneficiaries. The thugs and their accomplices were nabbed.

ODDS AND ENDS: John Keegan, TWA's district sales manager in Cairo, is rushing the season. We received his Xmas card on November 5 . . . Question we'd like answered: who was the wag who sent the message (patterned after the "Dragnet" TV show) over Colonial Airlines' teletype, describing current merger activities? . . . Dave Kuhn, TWA pilot and the author of a humorous article on airline pilots a couple of years ago ("Seniority, Sex and Salary") has another one covering the trip he and his wife made to Europe several months ago. Titled "One World, But Miles Apart," it contains some real rib-ticklers . . . Congratulations to Clarence N. ("Clancy") Sayen, president of Air Line Pilots Association, on being named by the Chicago Junior Association of Commerce and Industry as one of the city's five outstanding young men of the year . . .



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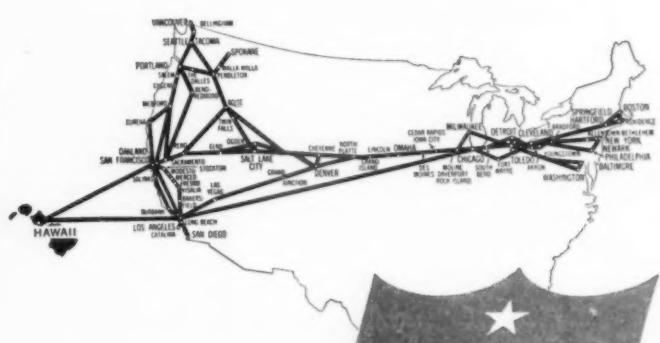
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Canada Moves Against U. S. Carriers

Canada's Air Transport Board has issued show cause orders to two U.S. carriers—Pan American and Colonial—concerning services offered by those lines which may be beyond the exact letter of the U.S.-Canada bilateral agreement.

The orders, which could lead to at least revision of the two U.S. lines' operating practices to Canadian points, are considered "retaliatory" moves which the Canadians are employing in view of a U.S. denial of Trans-Canada Air Lines' bid to operate a Montreal-Mexico City service via Tampa, Florida.

The show cause order to Pan American affects its Seattle-Whitehorse-Fairbanks service. That to Colonial involves its Washington-Ottawa-Montreal-New York service.

Behind these developments, which add up to a serious strain on relationships between the U.S. and Canada in the aviation field, is the complex TCA situation. Canadian officials feel the U.S., particularly the CAB, has prevented the

new TCA Mexico City service through picayunish reliance on the letter of the bilateral agreement.

As a result, they plan a similar attitude with respect to U.S. operations which are beyond the strict letter of the agreement. John Baldwin, chairman of the ATB, however, claims the actions against U.S. carriers thus far are "exploratory" rather than "retaliatory."

The U.S. position, which involves the State Department as much or more than CAB, is that we have a "world-wide policy" involved in the TCA dispute. That policy contemplates that any routes granted by us to foreign carriers or by foreign countries to our carriers should include "Fifth Freedom" rights.

The TCA proposal to operate to Mexico City through Tampa did not contemplate "Fifth Freedom" rights on the Tampa-Mexico City portion. Thus, U.S. officials say, it is against policy to grant the authorization.

CAB News

AS OF NOW . . .

A second report by Examiner Thomas L. Wrenn in the controversial New York-Balboa Through Service Case is expected momentarily with oral argument possible in December. It will then be up to the five Board members to prepare the case for its third journey to the White House. Up to now interchanges involving Braniff-Eastern and Pan American-Panagra-National have had the inside track for final approval.

There is no end in sight to the Los Angeles session of hearings in the Large Irregular Air Carrier Investigation now under way for three months. Best guess at this point is the case will move on to Seattle in March or April. Hearings first started in Washington, D. C., on September 3, 1953.

The issue of whether CAB can take permanent routes away from airlines will highlight the States-Alaska Case in which Washington hearings start next week. Both Alaska Airlines and Pacific Northern Airlines could lose some permanent Alaskan routes in the case.

Look for the recently instituted and seemingly-insignificant Charleston-Columbus, O. Service Investigation to become alive next year with the growing issue of trunk vs. local service air-lines.

RECENT CAB DECISIONS

• Denver Service Case expanded to include (1) issue of additional east-west service to Salt Lake City via Western or Continental, and (2) North American Airlines' application for San Francisco-Chicago route.

• Airline Reservations, Inc. d/b/a North Star, The Flying Irishman, and Air America Agency, ordered to cease and desist from representing itself as an air carrier when, in fact, it is a ticket agency.

• International Air Transport Association resolution relating to adoption of special "B" fares in the Middle-East, approved.

• Pacific Northern Airlines complaint against proposed off-season fares of Northwest Airlines between Anchorage and Seattle/Portland, dismissed.

CAB CALENDAR

Nov. 24—Oral argument before the Board on proposed regulation re Tariff Liability Rules. Washington, D. C. Draft Release 62.

Nov. 30—Hearing in Fayetteville Service Case. Tentative. To be announced. Docket 5592 et al.

Nov. 30—Hearing resumed in States-Alaska Case. Washington, D. C. Docket 5756 et al.

Nov. 30—Hearing in Airwork Limited Trans-Atlantic Cargo Permit Case. Washington, D. C. Docket 6188.

Nov. 30—Hearing in Lake Central Airlines Acquisition Investigation. Washington, D. C. Docket 5770 et al.

Dec. 1—Hearing in Niagara Falls Airport Case (American Airlines). Niagara Falls, N. Y. Docket 6125.

Dec. 1—Hearing in TACA International Airlines Foreign Permit Case. Tentative. To be announced. Docket 5476.

CAB MISCELLANY

Delta-C&S Airlines applied for permission to suspend at Kingston, Jamaica, in view of contemplated service to Jamaica through Montego Bay beginning about January 1, 1954.

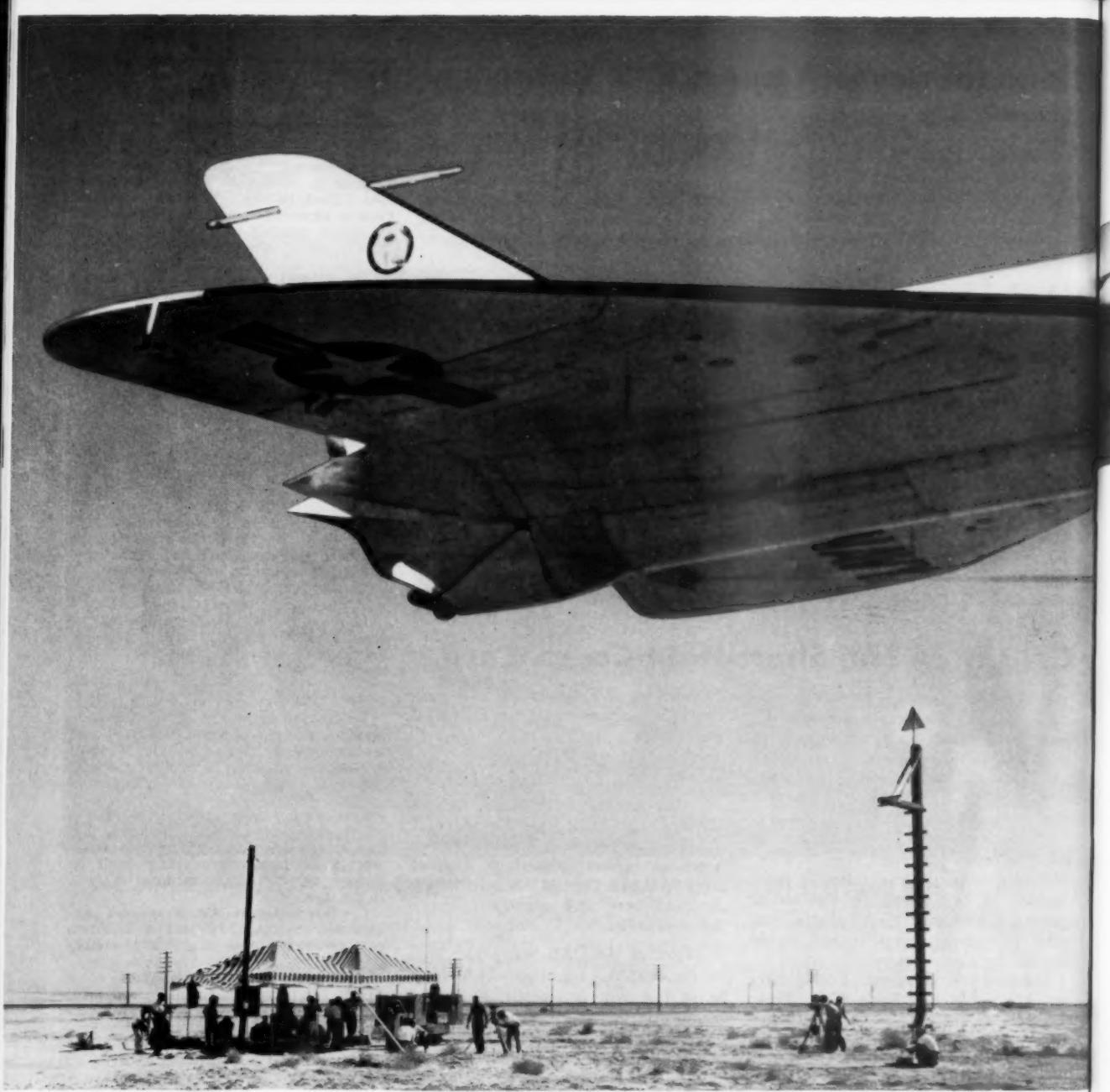
Mohawk Airlines wants immediate increase in temporary mail pay to offset rising costs and to bring present CAB rate in line with actual mileage operated. Break-even need, Mohawk says, is \$1.2 million annually as compared to present pay of about \$900,000.

Jefferson City, Mo., offers free air-

port privileges for any airline in Ozark Renewal Case certificated to serve the point.

North American Airlines asked for permission to present its case at the end of the Los Angeles session of hearings in CAB's Large Irregular Carrier Case.

United Air Lines petitioned for reconsideration of 3-2 CAB decision in which action on non-stop Seattle-Chicago application was deferred indefinitely.



A technical ground crew monitors the F4D flight by recording four individual passes over a three-kilometer course.

Official representatives check film of individual passes to determine average speed attained by the Douglas F4D.

LDCR James B. Verdin returns after pilot Westinghouse-powered F4D to record-shatter runs of 746.075, 761.414, 746.053 and 759.499 m.



Westinghouse J40 powers F4D to world speed record

U.S. Navy establishes mark of 753.4 mph

A Westinghouse J40 turbojet powered the Douglas F4D "Skyray" to a new high speed of 761.414 mph as it recaptured the world speed record for the United States by streaking to an official average of 753.4 mph over the required course.

Designed and manufactured by the Westinghouse Aviation Gas Turbine Division in South Philadelphia, Pa., the J40 and other outstanding turbojets now are being produced at the huge Westinghouse jet engine plant in Kansas City, Mo.

This J40 contribution to record-breaking jet progress is another example of Westinghouse turbojet leadership. Westinghouse Electric Corporation, Aviation Gas Turbine Division, Lester Branch P. O., Philadelphia 13, Pa.

J-54032

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U.S. Domestic Airlines Revenues and Expenses

Six Months Ended June 30, 1953

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	EXCESS BAGGAGE REVENUES	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUNDS & INDIRECT EXPENSES	NET OPERATING INCOME BEFORE TAXES
American	\$ 96,377,336	\$ 83,666,609	\$ 3,823,057	\$ 2,188,607	\$ 4,959,383	\$ 958,639	\$ 348,672	\$ 82,598,262	\$ 41,851,294	\$ 40,746,968	\$ 13,779,074
Braniff**	14,509,270	13,087,968	498,425	250,605	380,644	113,453	91,852	14,954,608	7,546,172	7,408,437	-445,338
Capital	21,974,611	19,150,676	589,941	633,852	468,907	119,478	630,846	20,597,012	9,738,493	10,851,519	1,377,599
Caribair	623,765	516,710	61,930	• • •	15,622	4,604	3,672	567,747	232,945	334,802	56,018
C & S **	4,190,437	4,285,394	222,112	133,391	96,911	36,854	4,482,845	2,137,355	2,345,490	307,392	
Colonial	3,076,657	2,531,908	324,228	33,515	43,171	23,718	110,410	3,002,516	1,290,330	1,712,186	74,441
Continental	5,222,117	4,473,978	499,319	41,030	108,077	38,061	3,409	5,051,781	2,679,724	2,372,057	170,336
Delta ***	18,060,161	16,279,994	604,691	312,812	534,319	215,887	10,783	16,539,221	8,375,118	8,164,105	1,520,960
Eastern	72,168,564	67,180,378	1,332,779	888,816	762,894	1,210,343	87,278	61,617,172	35,555,363	26,061,809	10,551,392
Hawaiian	2,301,311	1,573,517	377,559	• • •	308,523	25,386	7,837	2,323,096	980,048	1,343,048	-21,785
National	17,838,186	15,971,943	612,919	128,691	668,331	370,224	67,709	13,822,457	6,867,597	6,954,860	4,015,727
Northeast	3,052,679	2,464,715	1,007,680	53,395	61,267	11,286	6,767	3,621,110	1,562,919	2,059,191	31,569
Northwest	20,259,748	18,033,712	853,644	343,619	584,764	150,903	54,665	19,987,014	10,620,816	9,366,198	272,734
Trans Pacific	848,327	615,984	191,071	2,364	21,603	3,832	2,343	849,961	328,097	521,864	-11,134
TWA	64,399,826	57,463,284	2,600,456	1,623,984	2,000,997	511,240	85,461	58,941,181	31,757,276	27,183,905	6,048,645
United	77,118,450	65,802,858	4,631,113	2,204,810	2,907,830	613,710	93,179	67,336,508	31,395,555	35,940,953	9,781,952
Western	10,677,660	9,611,827	402,342	165,789	193,760	58,057	7,107	9,837,499	5,013,198	4,824,301	840,161
TOTALS	434,489,413	382,469,455	18,305,504	9,024,282	14,095,007	4,465,675	1,611,970	386,129,990	197,932,299	188,197,691	48,359,423
<small>* Braniff's figures do not include operations of local service ** Figures for C & S are through April 30. *** Merger between Delta Air Lines and Chicago and Southern Air Lines was effective May 1, 1953.</small>											

U.S. All-Cargo Airline Operations

Quarter Ended June 30, 1953

AIRLINES	TRAFFIC						REVENUES & EXPENSES						
	FREIGHT TON-MILES	AVAILABLE TON-MILES	TON-MILES FLOWN	% AVAILABLE	TON-MILES USED	PLANE-MILES	SCHEDULED MILES	% SCHEDULED	MILES COMPLETED	TOTAL OPERATING REVENUES	FREIGHT REVENUES	NON-SCHEDULED TRANSPORT REV.	
Aerovias Sud	195,632	286,200	68,39	47,700	59,700	79,89							
Flying Tiger	3,622,579	4,303,436	84,18	662,067	621,972	93,84							
Riddle	1,039,421	1,167,788	89,01	215,316	140,820	100,00							
Slick	4,019,465	5,139,683	78,20	715,617	856,664	59,24							
TOTALS	8,877,097	10,897,107	81,46	1,640,700	1,679,156	76,21							
	April, 1953												
Aerovias Sud	210,876	303,070	69,58	51,695	55,400	84,84							
Flying Tiger	3,259,535	4,130,094	78,92	635,399	601,355	93,92							
Riddle	927,611	1,258,720	73,69	234,069	145,514	100,00							
Slick	4,239,361	5,551,780	76,36	747,569	764,929	63,85							
TOTALS	8,637,385	11,243,664	76,82	1,668,732	1,567,198	79,49							
	May, 1953												
Aerovias Sud	298,521	316,451	94,34	54,050	58,300	91,77							
Flying Tiger	3,330,783	3,914,827	85,08	602,284	624,806	91,95							
Riddle	855,765	1,098,195	77,92	205,787	140,820	100,00							
Slick	3,934,218	4,797,281	82,29	709,918	673,670	70,07							
TOTALS	8,419,287	10,126,774	83,14	1,572,039	1,497,596	82,86							
	June, 1953												
Aerovias Sud	705,037	983,387	71,69	154,445	173,400	85,52	\$ 145,507	\$ 140,046	\$ 158,733	\$ 98,056	\$ 60,677	\$ -13,226	
Flying Tiger	10,212,897	12,348,377	82,71	1,899,750	1,828,133	93,23	1,815,725	1,586,780	1,599,584	1,083,994	515,590	216,141	
Riddle	2,822,797	3,524,703	80,09	655,172	427,154	100,00	427,658	433,816	728,434	490,826	237,608	-310,776	
Slick	12,193,044	15,488,744	78,81	2,173,104	2,295,263	63,96	2,353,245	1,602,495	357,281	2,480,421	1,477,751	1,002,670	-127,176
TOTALS	25,933,775	32,345,211	80,17	4,882,471	4,743,950	79,39	4,732,135	3,743,137	511,688	4,967,172	3,150,627	1,816,545	-235,037
NOTE:	<ol style="list-style-type: none"> Total second quarter figures for Aerovias Sud do not equal combined total for months shown above. CAB is awaiting receipt of adjusted reports. It is believed that figures shown above for Slick Airways are inclusive of military contract and charter operations. Under CAB reporting requirements traffic figures are supposed to be exclusive of defense contract operations. However, financial figures, i.e., total operating revenues and net operating income, reflect the net result of defense contract operations. This net figure is reported under Incidental Revenues, Account 4140, on CAB Form 41. U.S. Airlines has not yet filed reports covering operations of this period. 												

INTERNATIONAL AVIATION

Edited by Anthony Vandyk



INTERCOM

Canada's policy of switching Canadian and British engines for U.S. models in the Canadair versions of the Lockheed T-33 and the North American F-86 reflects the increasingly close association of the British and Canadian industries.

The decision to put the Avro-Canada Orenda into the Canadair Sabre as well as into the CF-100 was a major factor in causing the Canadian General Electric Company to resign as operator-manager of the Canadian government's jet engine repair and overhaul plant at Toronto. Although some 700 Canadair-built Sabres were fitted with GE J47's, many of them were given to NATO by the Canadian government and thus the number of J47's in RCAF service is comparatively small. The government is now negotiating with de Havilland-Canada to take over the Toronto plant.

In addition to producing the L-20 Beaver and its big brother, the Otter, de Havilland-Canada is designing a twin-engine jet trainer as a T-6 Harvard replacement for the RCAF. Company planners calculate that at least 80% of the RCAF's aircraft will be jet powered by 1958 and they consider that it will be cheaper and more efficient for pilots to be trained right from their first flight on a jet plane. Pilot conversion to piston engines in the remaining 20% could be conducted at squadron level, de Havilland believes.

The RCAF of course needs many other replacement types as well as trainers. Moreover, the Royal Canadian Navy requires new equipment. The Canadian aircraft industry is awaiting decisions on replacements for the Sabre, CF-100, Lancaster, North Star, and Avenger. Among the aircraft being considered for Canadian license production are the North American F-100, the Grumman S2F and the Bristol Britannia. There is also a possibility of original Canadian designs being adopted, although past experience has shown this to be a lengthy and costly procedure. Nevertheless, there are indications that the lack of decision on Canada's future aircraft program stems from reluctance on the part of the government to commit itself to having license-built models for all its combat aircraft.

BOAC Plans Flying Boats on U. S. Runs

The British Overseas Airways Corp. plans to operate 10-engine Saunders-Roe Princess flying boats to the United States and elsewhere within four or five years under a U.K.-government sponsored program to keep abreast of flying boat techniques in the belief that atom-powered aircraft of the future will be water based. A BOAC senior flying boat pilot, Captain Algar, recently arrived in the U.S. to make a preliminary survey of possible bases for Saunders-Roe Ltd.

When the Princess program was started after World War II it was planned that BOAC would operate the big turboprop-powered flying boats as air transport equivalents of the *Queen Elizabeth* and *Queen Mary*, but after BOAC indicated that it could not meet the cost involved, it was decided that the RAF should operate the Princesses as military transports.

Last year the British independent, Airwork, joined with Saunders-Roe to form a company for the operation of the boats on behalf of the government. Recently another independent, Aquila Airways, offered to buy the Princesses from the government for "over \$2.8 million" each.

Although the Princess program started in 1946, only one of the three boats ordered by the British government is flying; it started its flight trials last summer and to date has logged slightly more than 50 hours. The other two

boats are cocooned in partly completed condition pending availability of the Bristol Proteus 700 engine, which has more power than the 600 series used in the first Princess.

Latest information from Bristol discloses, however, that the company's development of turboprops "... makes it possible to offer the required power for the Princess with the use of single engines only, thus obviating the need for the elaborate coupling gear."

By the use of the new single units the boat will not need as many as the present 10 engines. It is not disclosed whether the new engine is a more powerful version of the Proteus or the turboprop development of the Olympus now reported to be in a well advanced stage at Bristol.

Turboprop power gives the Princess a remarkable performance. Grossing 330,000 pounds and with its capacity payload of 50,000 pounds, it can cruise at 360 mph for 3750 miles, according to the manufacturer's figures. By reducing payload to 21,500 pounds, range can be increased to 5270 miles.

Despite its excellent performance the Princess will not be cheap to operate and BOAC will have to be indemnified by special governmental arrangement. The main reason why the corporation gave up Short flying boat operations was that the cost of maintaining and operating bases for them was prohibitive.



SAUNDERS-ROE "Princess" flying boats may operate to U. S.

INTERNATIONAL AVIATION

MANUFACTURING

ITALY: Agusta has been awarded an Italian government contract for the supply of about 30 license-built Bell 47 helicopters.

FRANCE: Production orders for Dassault Mystere IVB and SO 4050 Vautour aircraft are provided for in France's 1954 defense budget; first production aircraft will be delivered in about two years. Also included in the budget are provisions for a pre-production series of SE 5000 Baroudeurs and for production of the Fouga 170R Magister jet trainer.

INDIA: Hindustan Aircraft, Bangalore, plans to place its HT2 primary trainer on the export market. Present production is at the rate of six aircraft monthly.

SWEDEN: Saab-32 Lansen reached supersonic speed during dive tests. Avon-powered plane, now in full production, will be used to re-equip most of the Swedish Air Force's 12 attack fighter squadrons.

BRITAIN: Rolls-Royce has built a full-size working model of a device for reducing jet noise developed at the College of Aeronautics, Cranfield, England. The system involves the projection of twelve "fingers" into the jet exhaust from the circumference of the tailpipe.

MILITARY

ITALY: The Italian Air Force's Fairchild C-119's will soon be flying again after having been grounded for several months due to propeller trouble.

FRANCE: A military airlift between France and Indo-China will be operated for the government by the SAGETTA company using SE 2010 Armagnacs.

SPAIN: Spanish Air Force is to be supplied with Lockheed T-33 trainers by the U. S. government. Later Republic F-84 fighters will probably be made available.

TRANSPORT

FRANCE: UAT has bought two Douglas DC-6A's from Slick Airways (at a reported price of \$1,800,000 each) and will convert them into passenger planes in France. It also is reported negotiating to buy another DC-6A from The Flying Tiger Line and contemplating the purchase of three DC-6B's.

UAT has established an engine overhaul plant, known as REVIMA, at Caudebec. The first overhauled R-2000 will be delivered this month and the first Ghost in January,

Dollar allocations for the purchase of DC-6B/C aircraft by independents have been assigned by the French Authorities: Aigle Azur and CGTA-Air Algerie are permitted to buy two each and MAI, TAI-Messageries Maritimes holding company, three.

BRAZIL: The U. S. Export-Import Bank has authorized a \$3.1 million credit to assist Lockheed Aircraft Corp. in the sale of three Super Constellations to VARIG. This is seen as indication that the airline will be given the license for the Rio de Janeiro-New York route.

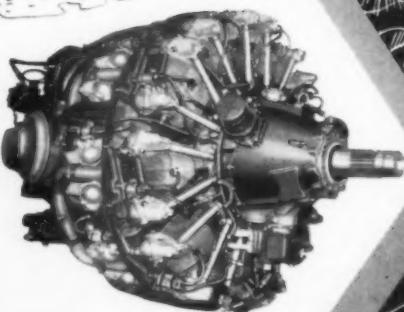
Panair do Brasil has been authorized to receive a \$3 million Brazilian-government guaranteed loan from the Banco do Brasil in connection with the purchase of its four DH Comet II's. The loan will not be granted until next fall when the planes are due to be delivered.

ITALY: Alitalia has received the first of four DC-6B's ordered as DC-4 replacements on its routes to Latin America and to Beirut. When DC-6B service is inaugurated early next year it will increase its fares to IATA level.

NETHERLANDS: KLM has ordered two additional Convair 340's, bringing its order up to 14 planes. Six of them will be used in the West Indies Division.

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En Route

WAYNE W. PARRISH



Viscount. Last July while zig-zagging around Europe I was able to arrange my first flights on two of Britain's new airplanes, both now being operated by British European Airways.

One was the Viscount, the turbo-prop job which Vickers built for BEA and other carriers around the world. The engines, as all of you should know, are jet with propellers. I flew from Stockholm to London via Copenhagen and the flight was thoroughly enjoyable.

Like everyone else, I guess, I had expected a sensation of speed simply because the engines are jet. But BEA has never claimed that the Viscount's chief asset was speed. Having flown to Singapore in a Comet, which is pure jet powered, I felt a little let down by the Viscount, but the let-down was of my own creation, since I was expecting something which doesn't exist and for which no claim had been made.

What the Viscount does have, and this is quite an asset, is a quiet cabin. Conversation can be carried on without strain. It seemed to me that the Comet was even quieter but the facts may disprove this. In any event, it was a pleasure to fly so quietly. Another asset is the big windows, exceptionally large, although big windows have lost a little of their glamor now that airplanes are flying higher.

Take-off Smooth. A notable characteristic of the Viscount is the high shrill noise of the engines on the ground. Inside the cabin this noise is hardly noticeable, but later on I was on airports when the Viscount was taxiing in and out and the noise was quite pronounced and can be irritating to the ears close up.

I thought the take-off was unusually smooth and rapid, something akin to, but not as pronounced as, the sensation of the Comet take-off. We flew at 18,000 feet and clouds obscured the view of the ground and sea most of the way to London. On the Stockholm run the Viscount competes with the Douglas DC-6B flown by Scandinavian Airlines System, and beats the DC-6B by a few minutes. Since there is little difference in speed, flying the Viscount vs. the DC-6B becomes a matter of personal choice.

Elizabethan. From Madrid to London via Bordeaux, I flew for the first time in the Airspeed Ambassador, a piston-engined airplane which BEA now calls the Elizabethan. It is among

the last of the piston-engined transports to be produced, but I liked it very much.

I suppose it's heresy to say this, but I enjoyed my inaugural Elizabethan flight just as much as I did the Viscount. For a piston-engined airplane the take-off was very smooth and fast—and quiet. It's a high-wing airplane, giving excellent visibility for all passengers. The retracting and letting-down of the wheels is an unusual sight for the customers, and a little awesome. Not as speedy as the Viscount, but not too far behind it, I think the Elizabethan is an excellent airplane for average Continental routes.

Odds and Ends. A big new terminal is under construction for Barajas Airport at Madrid, Spain. I suspect it is more ambitious and costly than traffic at Madrid requires. In the meantime the present terminal takes the trophy as being the dirtiest and most unkempt airport building in the world, bar none. There's no excuse whatever for its being so filthy.

• In Madrid there is a chain of restaurants called "the California," American-style menus and counter service. Soda fountain, eggs any style, hamburgers, and excellent fast service. If you order tomato juice the gal cuts up fresh tomatoes and puts them in a mixer, adds lemon, salt and pepper; no canned stuff. Grape juice is made fresh from grapes.

It's a wonderful chain for the American who gets hungry for home stuff. And it's the one and only place in Madrid where the milk is good. The management would be doing a service to Americans by providing a menu in English.

• Frank Howell, TWA's manager in Madrid, deserves a pat on the back for the tourist guide he gives out free to visiting tourists. "Travel Tips for Spain" it's called, and it's mighty helpful. Covers all of the country.

African Flies. North Africa breeds a particularly irritating kind of fly. It clings and it bites. When I boarded Air France at Tangiers to return to Paris a lot of flies boarded too. May I suggest to Air France that it keep an aerosol bomb in each plane and have the cabin crew use it on departing from African ports? Those flies can be awfully annoying.

• In Stockholm, Sweden, I've found the world's finest amusement game. It's

just the thing when you want to blow off steam. After a fine dinner on the Strand Roof with Per A. Norlin, president of SAS, we went to Stockholm's famous amusement park just outside the downtown section and Norlin took me direct to his favorite concession. For a small amount of money, about a dime, you get a half-dozen hard rubber balls. At the rear of the tent are rows of all kinds of crockery. There's no prize, no nothing. You just try to break all the crockery you can just for the helluva it.

Haven't had such a good time in years. I just imagined some of that crockery represented things I don't like and I threw as hard as I could. Wonderful for airline presidents and exasperated, temperamental editors. Next time in Stockholm you'll know where to find me. I sure love to hear that crockery smash to bits.

• For good dining I can still recommend most highly the Djurgardsbrun restaurant just outside Stockholm. It's along a canal. The menu and service are excellent. Another restaurant which has been done over recently, quite picturesque, is the Wardhuset Stallmästaregården. I had dinner there with Knut Hagerup-Svendsen, v.p. of operations for SAS. The menu didn't seem to be tops, but that may have been a momentary matter. It's worth a visit if only to see the gardens and miniature lakes.

Bidets & Bouquets. Want to buy a bidet? Gene Connolly, who runs those worthy Aircraft Trade Shows in New York each summer, sends me a page from the N. Y. *Journal of Commerce* in which a building material company called Aetna at 1289 McDonald Avenue, Brooklyn, advertises bidets for sale. No prices given. Thanks, Gene, we'll get the U. S. bidet-conscious yet.

• Here are two long overdue bouquets. One goes to L. G. Wilkinson, a purser on an Eastern Air Lines local flight from Miami to Jacksonville, a young chap very much on the ball. The other goes to Robert Lorenz, Pan American purser on flights from Miami to Caribbean points, who is the best cabin attendant I've ever found anywhere, anytime.

• Bert Hemphill, president of Hemphill Air Service in Los Angeles, writes that he and Mrs. Hemphill made a round-the-world trip not long ago, mostly by air, and especially praised the service of Qantas, the Australian airline, and TEAL, Tasman Empire Air Lines. They flew on the new Qantas route between Australia and Johannesburg via the Cocos Islands, a brand new aerial trade route. Bert suggested I might like to take the same trip. Price of his advertised world tour: \$5290. Ouch! Guess I'll continue my slumming.

• What a tough job it is to get a drink of plain ordinary water in Europe! At the A La Broche restaurant on Jermyn Street in London I had to ask the waitress three times before I got some. English restaurants have more headwaiters, waiters, waitresses, busboys and other attendants—and less real service—than all other places in the world. (Or so it seems sometimes.)

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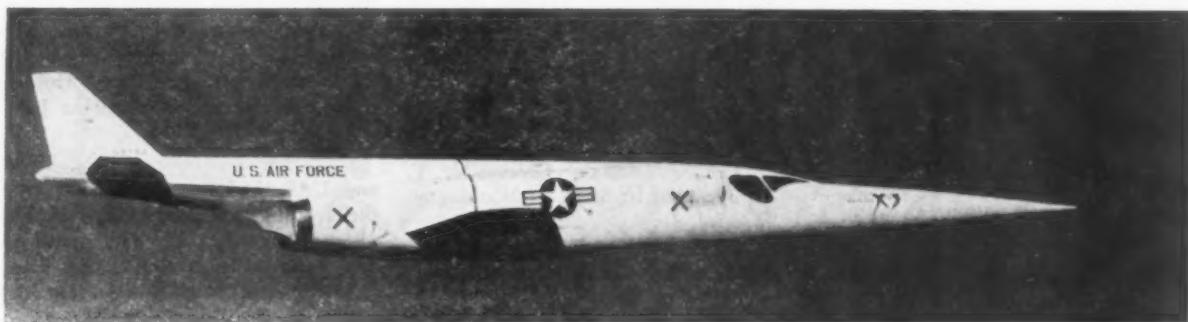
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First Photos and Data on Douglas X-3 Released

The Air Force took the security wraps off its Douglas X-3 research plane last week as it prepared to turn the radically designed aircraft over to the National Advisory Committee for Aeronautics for further study.

The X-3, first flown late last year at Edwards AFB, Cal., has a slender fuselage with a long, tapered nose and short wings located well back toward the tail. Length is 66 feet 9 inches, nearly three times its wing span of 22 feet 8 inches. The top of its tail mea-

ures 12½ feet from the ground. Gross weight slightly exceeds that of a commercial DC-3, according to the Air Force.

Powered by two Westinghouse J34 axial flow turbojet engines originally, the X-3 is designed ultimately to cruise at supersonic speeds and high altitudes, although it has been indicated new powerplants of greater thrust may be used.

The plane carries 1200 pounds of special research instruments, many of

which record temperature rise caused by air friction on the plane and the effect of high temperatures on the structure and components. Temperature readings are registered at 150 points on the aircraft. Titanium is used extensively in the X-3.

The X-3 was designed and built by Douglas' Santa Monica Division under joint sponsorship of the AF, NACA, and the Navy. The project has been directed by the AF's Air Research and Development Command.

Cuts in CAA Operations To Reach \$9.4 Million

A cut of \$9.4 million in Civil Aeronautics Board expenses and salaries is being effected. The economies were not detailed by Under Secretary of Commerce for Transportation Robert B. Murray upon announcement of the goal, but they are understood to involve the following areas of operation:

- Staff and overhead cuts in Washington and in regional headquarters are to yield \$2 million;

- Communications services, domestic and overseas, to be cut back by modification or discontinuance. Somewhat less than 50 stations would be affected, for an estimated saving of well over \$2.5 million;

- LF/MF radio ranges would save over one quarter million, with some 50 stations scheduled for replacement by omniranges;

- Federal airways are to be cut \$1.4 million, mainly by savings in maintenance training and operations;

- Auxiliary engine generator shutdowns, which are due to total close to 600 at points where commercial sources of emergency power are available, are expected to save over \$350,000;

- Air safety will become more the responsibility of the industry, reducing the administrative load on CAA. Estimated saving: over \$750,000.

Pan Am Comet Contract Reported Extended

Pan American World Airways' contract for Comets has been extended according to British Transport Minister Lennox-Boyd. The British Air Registration Board and the CAA have "reached a substantial measure of agreement," Lennox-Boyd said, with only a "small but important" area left to be settled.

The PAA contract reportedly will lapse if certification of the jet transport by the CAA is not assured.

NAL Proposes 'Copter Charter Rate of \$2

National Airlines, announcing that problems of helicopter training and CAA certification were handled more easily than expected, has proposed a helicopter charter rate of \$2.00 per mile for its eight-passenger Sikorsky S-55. The carrier consequently put in its request for less than the statutory 30-day notice.

By-Pass Engine Urged By AA Engineers

Jets are admirable as flying machines, but as airline transports they leave several important things to be desired. This is the opinion of two of American Airlines' chief planners: W. C. Lawrence, director of development engineering, and H. W. Hoben, director of aircraft analysis.

The turbojet at its present stage of development eats up fuel too rapidly, has too little power on take-off, and makes too much noise on the ground, Lawrence and Hoben told a meeting of the Southern California Section of the Society of Automotive Engineers.

"This feeling . . . could conceivably change very quickly if some bold individual buys a few jet transports for operation on competitive routes," they observed.

Likeliest answer to the problems of the turbojet would be a by-pass engine, Lawrence and Hoben feel. Noting that there is apparently no such engine under development in this country, they observed: "We cannot understand why this should be . . . it is apparent that the military have not been convinced [of its value]."

EAL Reported Ordering 12 Douglas DC-7's

Type certificate for the DC-7 has been issued to Douglas by the CAA, as industry reports indicate that Eastern Air Lines has placed orders for 12 of the planes. EAL recently canceled orders for six Lockheed Super Constellations and took delivery on the first of 16 remaining L-1049C's.

If the order has been placed by Eastern, the Douglas backlog on DC-7's should now stand at 81. American is due to put the first DC-7 into service on November 29, with a non-stop flight between New York and Los Angeles.

Engineers Term Turboprop Unsuitable for Transports

Turboprop power for commercial transports has been discounted by three leading aircraft design engineers at a meeting of the Society of Automotive Engineers in Los Angeles.

George Snyder, chief of preliminary design for Boeing Airplane Co., Carlos Wood, chief of preliminary design for the Santa Monica division of Douglas Aircraft Co., and C. L. (Kelly) Johnson, chief engineer of the California division of Lockheed Aircraft Corp., comprised the trio who vetoed the turboprop.

* Snyder said Boeing's studies indicated a jet transport using four P&W J57 engines will have to be a big airplane to operate economically. But, he said, the same transport powered by P&W T34 turboprops would require the same capacity. For long haul operations, he added, the two engines had comparable economies and, in the case of two competing airlines, the one flying J57 jets would get all the business.

* Wood summed up his objections to the turboprop this way: "When a turboprop fails all hell breaks loose. . . If it fails at high speed it just becomes unglued. . . Lots more has to be done before we ask passengers to ride in a turboprop plane."

* Johnson also discounted the possibility of any early development of the ducted fan, or by-pass, engine suggested as a compromise between the turbojet and the turboprop. Johnson said 10 ducted fan engines had been built in this country, but that the military had given up on this type of power plant because it was not effective in supersonic ranges.

Boston, Philadelphia 3c Mail to Fly

Carriage of first class mail by air amounted to almost 1.5 million pounds from October 6 to October 30. The mail carried by the four participating airlines (UAL, TWA, AA, CAP) was predominantly eastbound. Inclusion of mail headed toward Chicago from the Boston and Philadelphia areas is expected to help equalize the traffic.

Eastbound totals: Chicago-N. Y. 623,839 pounds; Chicago-Washington 274,665.

Westbound totals: N. Y.-Chicago 405,529; Washington-Chicago 147,330.

Murray: No 'Important Investigations' of CAB

Under Secretary of Commerce Robert B. Murray, Jr., has disclaimed knowledge of any major administration changes which may affect the Civil Aeronautics Board or its individual members. Addressing the Aircoach Transport Association at a buffer supper in the Sheraton Carlton Hotel, Murray said "we know of no investigations that are important" that have to do with CAB or a member of the Board or which would lead to any recall or resignation of a member or members of the Board.

Murray described relations between Commerce and CAB as "very close," adding "we are getting wonderful cooperation from the Board." He said he does not believe "any great change is contemplated in the CAB," and that he does not know how such reports got started, but that they "could be the result of the harvest moon or the warm Indian Summer." (For a guide to Indian Summer in Washington, see AMERICAN AVIATION, October 12.)

USAF's Douglas Sees SAC As Best Deterrent

Best U. S. defense is a good offense, according to Under Secretary of the Air Force James H. Douglas, Jr. "Devastating" striking power, rather than an elaborate air defense system, would be the best deterrent to an attack on the U. S., Douglas told a luncheon honoring the 1953 Harmon Trophy winners.

Douglas said that there is no concern in the USAF over reduced budgets or limits on programs. He said that most cuts had been made through "involuntary postponements" due to production lagging behind schedules.

San Francisco Sues United Over Fees

The city of San Francisco is suing United Air Lines for \$341,000 in unpaid landing and take-off fees at San Francisco International Airport. The suit springs from a new schedule of fees established by the Public Utilities Commission of San Francisco on January 1, 1951.

At that time two airlines, TWA and UAL, had lease agreements with the city which included utility fees. The 40-year contract UAL had signed in 1947 provided for take-off charges based on a disposable load formula. The city maintains that the contract did not foresee the great increases in weight and size of aircraft that have occurred since then.

United has paid according to its 1947 contract and the city is suing for the difference.

The case involves TWA and Western Air Lines as well as UAL. Western, which had no contract, claims that unequal charges between carriers would be discriminatory.

New Production Line Speeds Turbo-Compounds

New "automated" assembly line used in the production of Curtiss-Wright Turbo-Compound engines requires only 42% as much space as its predecessors, but increases production capacity by 250% according to Roy T. Hurley, president and board chairman of C-W.

The new production line has cut both cost and manpower requirements in half for the new engine. According to Hurley, C-W now is on a level with General Motors in shipping \$14,000 worth of goods for every man-year.

Commerce Group to Weigh Single Agency

The desirability of a single government regulatory body for all transportation is scheduled for study by the Transportation Advisory Council of the Department of Commerce. The council advises the Under Secretary of Commerce for Transportation on policy matters.

Also due for consideration by the group is the effect of first-class-mail-by-air experiments.



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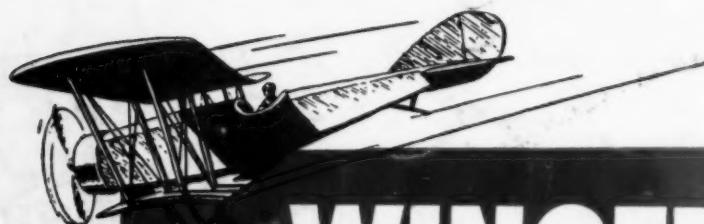
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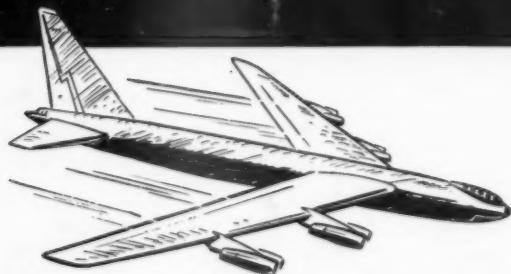


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